Denali National Park and Preserve
Alaska

National Park Service
U.S. Department of the Interior



Denali Park Road

Final Vehicle Management Plan and Environmental Impact Statement

ABSTRACT
UNITED STATES DEPARTMENT OF THE INTERIOR – NATIONAL PARK SERVICE
DENALI NATIONAL PARK AND PRESERVE
VEHICLE MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT

The National Park Service (NPS) has prepared this *Denali National Park and Preserve Vehicle Management Plan / Environmental Impact Statement* to evaluate alternatives for managing vehicle use along the Park Road at Denali National Park and Preserve (Denali or park). Since the 1920s, visitors have traveled the Park Road in buses provided by a park concessioner. Although visitation was relatively low before 1972, it rose quickly in the years that followed in direct response to the opening of the George Parks Highway, which linked the park to Anchorage and Fairbanks. Park managers instituted a mandatory visitor transportation system at the time to minimize disturbances to wildlife and scenery anticipated by the upsurge in visitor numbers. The present approach for managing vehicles on the Park Road is based on the park's 1986 general management plan, which established an allowable seasonal limit of 10,512 vehicles on the Park Road past mile 15 from approximately Memorial Day to a week after Labor Day. This seasonal limit has served well for many years as a means to manage vehicle use and provide quality visitor opportunities. However, the consistent growth in tourism that Alaska has experienced over the last decade has resulted in increasing visitation to Denali National Park and Preserve. As a result, the *Denali Vehicle Management Plan* is intended to assist park managers with decision making and management of vehicles on the Park Road for the next 15 to 20 years.

In this vehicle management plan / environmental impact statement, the Park Service analyzes three management alternatives and the environmental impacts associated with implementing them. Alternative A is the no-action alternative that would continue current management. Alternative B, "Optimized Access," would promote maximized seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road. Alternative C, "Maximizing Visitor Opportunities," would promote a variety of opportunities that range from brief experiences in the park's entrance area, to short and long visits along segments of the Park Road, to multiday experiences in the park's backcountry. From this range of alternatives and with consideration of public comments received on the draft plan, NPS managers have identified and developed a preferred alternative that meets the vision, goals, and objectives, and identifies the strategies (including user capacity), for managing vehicles on the road in a fashion that optimizes visitor experience and preserves park resources and values. This new alternative, Alternative D, "NPS Preferred Alternative," would combine a maximum use level for Denali Park Road with indicators and standards to protect visitor experience and park resources.

This environmental impact statement has been prepared in accordance with the National Environmental Policy Act to provide the decision-making framework that (1) analyzes a reasonable range of alternatives to meet project objectives, (2) evaluates potential issues and impacts on the park's resources and values, and (3) identifies mitigation measures to lessen the degree or extent of these impacts. Impact topics that have been fully analyzed in this document include visitor use and experience, the transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, and socioeconomics. All other impact topics have not been fully analyzed because the resource does not exist within the park or project area, or implementation of any of the alternatives would result in no effects or negligible to minor effects on those resources.

EXECUTIVE SUMMARY

PURPOSE OF ACTION

The purpose of the proposed National Park Service action is to improve the management of vehicles along the 92-mile-long Denali Park Road. The goal of the *Denali National Park and Preserve Vehicle Management Plan / Environmental Impact Statement* is to provide a high-quality experience for visitors; protect wilderness resources and values, scenic values, wildlife, and other park resources; and maintain the unique character of the Park Road. The alternatives consider the Park Road's user capacity (the maximum number of vehicles that could be accommodated on the road during the peak visitation period of May through September). The plan provides a means to assess the effectiveness of the transportation system in protecting park resources and providing for visitor access and enjoyment.

NEED FOR ACTION

The current approach for managing vehicles on the Park Road is based on the park's 1986 general management plan, as amended, which established an allowable seasonal limit of 10,512 vehicles on the Park Road past mile 15 from approximately Memorial Day to a week after Labor Day. While the overarching goal of the limit was to protect opportunities for viewing scenic landscapes and wildlife health and habitat, the limit was not connected to more refined desired conditions in a logical framework that could be measured and monitored over time.

Although the vehicle limit is clearly measurable, it is less clear that a numerical limit alone is enough to adequately protect park resources and provide visitors with freedom of movement along the Park Road. Other factors come into play as indicated by a multidisciplinary road study that began in 2006 to expand understanding of the impacts of traffic volume and traffic patterns on the park's physical, biological, and social environment. These factors include visitor perceptions of crowding at wildlife stops and rest stops, interactions between buses and wildlife, and the patterns of wildlife movements along the Park Road corridor. In addition, there is a growing demand for the Park Road experience and trends indicate that visitation to Alaska and the Denali area will continue to increase.

As a result, this plan is needed to set measurable indicators and standards that would ensure key park resources and values along the Park Road are adequately protected in accordance with desired conditions, especially in light of the potential for increased visitation. These resources and values include (1) wildlife populations, habitat, and the processes and components of the park's natural ecosystem; (2) wilderness character and values, and wilderness recreational opportunities; (3) the scenic and geologic values of Mount McKinley and the surrounding mountain landscape; (4) visitor enjoyment; and (5) the inspiration visitors derive from the park's natural features and opportunities to observe wildlife in their natural habitat. Additionally, an adaptive management approach that employs more sophisticated science, modeling, and monitoring techniques to effectively protect resources and provide high-quality visitor experiences is needed to allow park managers the flexibility to adjust operations in response to observed resource protection or visitor use issues.

PLANNING GOALS AND OBJECTIVES

The goals provide descriptions of what would be achieved, while the objectives list more specific outcomes of the goals.

Goal 1: Protect the exceptional condition of the park's resources and values through informed, proactive, and transparent management.

Objectives:

- Manage the transportation system to ensure protection of wildlife populations, wildlife habitat, and the processes and components of the park's natural ecosystem.
- Manage the transportation system to ensure protection of wilderness character, wilderness resource values, and wilderness recreational opportunities.
- Continue to protect and promote the historic character of the Park Road and related elements of the cultural landscape.
- Share monitoring findings with the public and inform them of management actions regarding the transportation system.

Goal 2: Provide high-quality and appropriate visitor opportunities on the bus.

Objectives:

- Ensure a transportation system that provides the park's interpretive themes and messages to all visitors as a means to encourage public understanding and support of park resources and values.
- Ensure a transportation system that provides a high-quality opportunity for viewing scenic landscapes and wildlife.
- Provide a bus environment that enables visitors to engage with the park resources and values in a meaningful way.

Goal 3: Provide access to recreational and educational opportunities along the Park Road.

Objectives:

- Provide freedom of movement.
- Provide a system that is universally accessible and able to accommodate visitor needs and equipment.

Goal 4: Make the park transit/access system understandable and user friendly.

Objectives:

- Clearly communicate information about the system through a variety of means.
- Enable visitors to easily choose the experience that meets their needs within the limits of the system.
- Ensure the transportation system enables visitors to spend time at an NPS visitor center.

Goal 5: Provide a transportation system that meets visitor access needs.

Objectives:

- Optimize seating capacity within the system design.
- Maximize system flexibility to meet future visitor demand, while sustaining desired resource conditions and visitor experiences.
- Provide stability and predictability in the system.
- Develop a system that is affordable and offers opportunities for the full range of park visitors.

Goal 6: Provide access for subsistence use and inholders.

Objectives:

- Provide legally required access to Kantishna inholdings.
- Provide legally required access to subsistence users.

ALTERNATIVES

The alternatives under consideration include a required "no-action" alternative (alternative A, which is a continuation of current management) and three action alternatives (alternatives B, C, and D), which were developed by an interdisciplinary planning team with feedback from the public and other experts during the planning process. The alternatives are briefly described below, and include a number of actions that would be common to all alternatives, as well as those common to the action alternatives B, C, and D.

An important element common to all three action alternatives is that vehicle use on the Park Road would be adaptively managed to achieve specific desired conditions. Using indicators and standards, the current visitor experience and resource condition would be maintained or improved. For the restricted section of the Park Road (Savage River to Wonder Lake), the following indicators would be monitored annually:

- sheep gap spacing
- nighttime traffic levels
- large vehicles
- vehicles at a wildlife stop
- vehicles in a viewscape
- wait time for hikers
- vehicles at rest areas and Eielson Visitor Center

Additionally, comprehensive monitoring and data collection would take place every one to five years for the following to detect any impacts attributable to changes made to the transportation system

- natural resource condition
- visitor satisfaction

Alternative A: No Action (Continuation of Current Management)

Alternative A represents existing conditions. Vehicle use on the restricted section of the Park Road would continue to be managed through a seasonal limit of 10,512 vehicles; this limit was set in the 1986 general management plan and then formalized in regulations in 2000. The regulated season begins on the Saturday of Memorial Day weekend and continues through the second Thursday following Labor Day, or September 15, whichever comes first. Allocation for segments of the transportation system and other vehicle use were modified in the 1997 *Entrance Area and Road Corridor Development Concept Plan* and the *Superintendent's Compendium*.

A check station where staff count visitors and vehicles was established on the road at the Savage River in the 1970s.

Resource monitoring and visitor surveys would continue to be conducted to address areas of concern but are not part of a formal adaptive management approach to maintain or improve resource condition and visitor experience along the Park Road.

Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. The current management zoning could allow for an increase from the current condition in vehicle use west of Eielson to Wonder Lake.

Alternative B (Optimizing Access)

This alternative would promote maximized seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road. Visitors would have access to a highly structured transportation system that offers predictability, efficiency, and greater opportunity to have a park experience of choice, while meeting set standards for natural resource protection and visitor experience.

To fully optimize the transportation system, a majority of seats on both transit and tour buses would be filled by prebooking visitors (independent and organized groups). This would allow managers to predict daily vehicle needs and maximize the flexibility of the system to accommodate visitor demand.

Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. This may allow for future growth in vehicle use west of Eielson to Wonder Lake.

Alternative C (Maximizing Visitor Opportunities)

This alternative would promote a variety of visitor opportunities that range from brief experiences in the park's entrance area, to short and long visits along segments of the Park Road, to multiday experiences in the park's backcountry. Visitors would have opportunities for spontaneity and freedom during their park visit, while set standards for resource condition and visitor experience are met.

The transportation system in this alternative would separate tour and transit functions by developing a self-guided economy tour. Distinguishing the economy tour experience from transit offers benefits to both user groups. Dedicated transit services would provide more seating for eastbound hikers, increasing visitors' freedom of movement. A dedicated economy tour service would provide visitors with a modest tour experience.

To further preserve wilderness resource values and contemplative visitor experiences, a new management subzone on the Park Road would be created west of Eielson Visitor Center to Wonder Lake (Wildlife Viewing Subzone 3). This section would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition.

Alternative D (NPS Preferred Alternative)

This alternative would offer visitors the opportunity to have a high-quality experience using a transportation system that offers predictability, efficiency, and a variety of experiences.

To fully optimize the transportation system, a majority of seats on both transit and tour buses would be filled by prebooking visitors (independent and organized groups). This would allow managers to predict daily vehicle needs and maximize the flexibility of the system to accommodate visitor demand.

In addition to managing for desired conditions, the maximum level of vehicle use on the restricted section of the Park Road would be 160 vehicles per 24-hour period. This limit includes all motor vehicles counted westbound at the Savage River Check Station. The 160-vehicle limit is derived from traffic model simulation results and extensive scientific research on visitor preferences and resource condition.

To further preserve wilderness resource values and contemplative visitor experiences, a new management subzone on the Park Road would be created west of Eielson Visitor Center to Wonder Lake (Wildlife Viewing

Subzone 3). This section would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition.

ENVIRONMENTAL CONSEQUENCES

The environmental consequences of the actions in each alternative were analyzed. This analysis evaluated the magnitude of impacts and how these impacts compare to current conditions. The cumulative impact assessment outlines overall impacts resulting from past, current, proposed, and reasonably foreseeable management and other actions. The analysis is intended to guide the decision maker in choosing a management action based on an objective understanding of environmental consequences.

The Park Service considered six impact topics for detailed analysis, including

- visitor access, use, and experience,
- transportation system and traffic,
- wildlife and wildlife habitat,
- wilderness,
- park management and operations, and
- socioeconomics.

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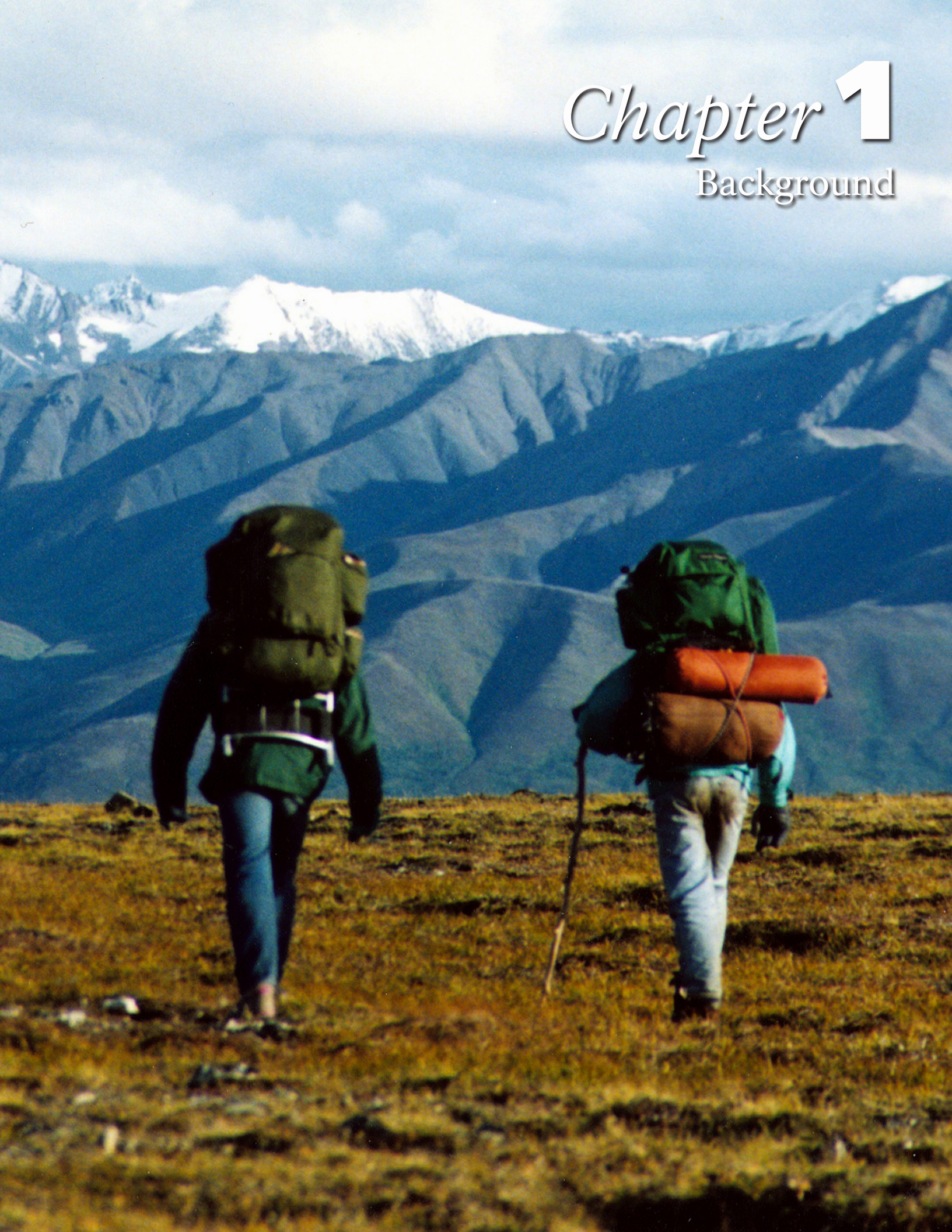
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Chapter 1
Background

INTRODUCTION

The National Park Service (NPS) is evaluating alternatives for the management of vehicle use along the primary road (Park Road) in Denali National Park and Preserve (see figure 1). This *Denali National Park and Preserve Vehicle Management Plan / Environmental Impact Statement* is intended to assist park managers with decision making and management of vehicles on the Park Road for the next 15 to 20 years. In this vehicle management plan / environmental impact statement (EIS), the Park Service analyzes four management alternatives, including a no-action alternative, and the environmental impacts associated with implementing the alternatives (the alternatives are described fully in chapter 2 of this document).

From this full range of alternatives and with consideration of public comments received on the draft plan, NPS managers have identified and developed a preferred alternative, alternative D, that would implement the vision, goals, objectives, and strategies (including user capacity) for managing vehicles on the road in a fashion that optimizes visitor experience and preserves park resources and values. The plan would continue to guide and prioritize long-term monitoring activities along the road corridor to assess whether desired conditions are being achieved and maintained. As part of the overall management strategy, it may be necessary that future adjustments to the transportation system and nonsystem use are made to ensure that desired conditions are met. The public would be informed of any future decisions regarding the management of the road, including any necessary adjustments to the transportation system.

The environmental impact statement has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.9). This chapter presents information on why the Park Service is taking action at this time to evaluate a range of alternatives and management actions for use of the Park Road at Denali.

Specifically, this chapter includes the following:

- The purpose of and need for the action
- Planning goals and objectives
- The planning background, including desired conditions
- A discussion of issues and impact topics identified during the scoping process and considered in preparation of the plan / environmental impact statement, as well as issues dismissed from further analysis
- The relationship to other park plans
- Applicable laws, regulations, and policies

PURPOSE OF ACTION

The purpose of the proposed NPS action is to improve the management of vehicles along the 92-mile-long Denali Park Road (see figure 2). The goal of the plan is to provide a high-quality experience for visitors; protect wilderness resource values, scenic values, wildlife, and other park resources; and maintain the unique character of the Park Road. The proposed alternatives consider the Park user capacity (the maximum number of vehicles that could be accommodated on the road during the peak visitation period of May through September), and provides a means to assess the effectiveness of the transportation system in protecting park resources and providing for visitor access and enjoyment.

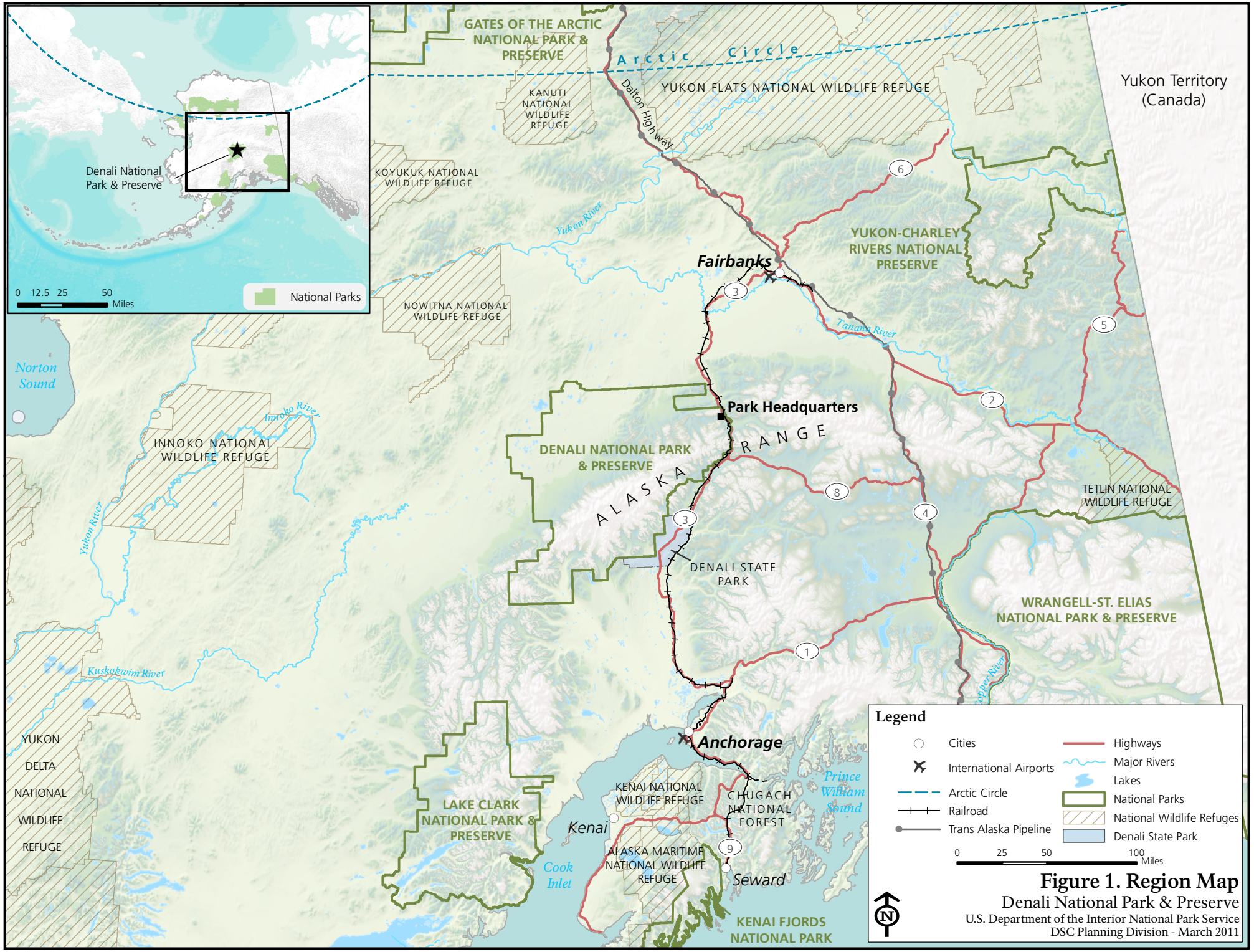
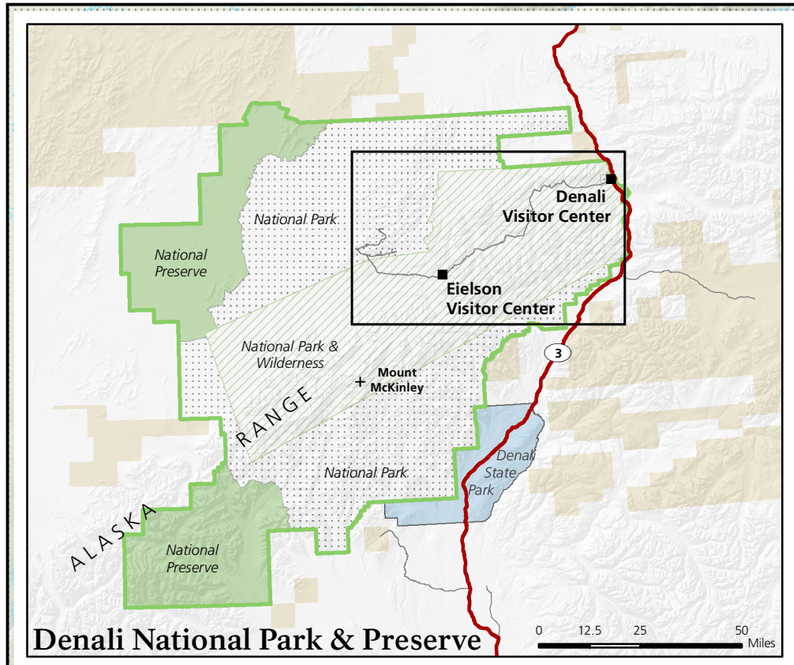


Figure 1. Region Map

Denali National Park & Preserve

U.S. Department of the Interior National Park Service
DSC Planning Division - March 2011



Caribou Creek
Spruce Peak
Glacier Peak
Wickersham Dome
Kantishna
Busia Mountain
Moose Creek
Wonder Lake
Wonder Lake
McKINLEY RIVER
McKinley Bar
Turtle Hill
Muddy Clearwater Creek
Creek
Thorofare River
MULDROW GLACIER
Red Mountain
Anderson Pass
Sunset Glacier
West Fork Glacier
Toklat River
Stony Hill
Thorofare Pass
Green Dome
Eielson Visitor Center
Polychrome Mountain
Polychrome Pass
Polychrome Overlook
Divide Mountain
Mount Sheldon
Cabin Peak
Stony River
TOKLAT
East Fork River
Susitna River
Savage River
TEKLANIKA
Mount Wright
Primrose Ridge
Mount Margaret
Sanctuary River
Teklanika River
TEKLANIKA RIVER
Igloo Creek
Igloo Mountain
Double Mountain
Sable Mountain
Sable Pass
Cathedral Mountain
WYOMING HILLS
Sanctuary River
Savage Cabin
Savage River
Mount Healy
Sugar Loaf Mountain
Wilderness Access Center
Denali Visitor Center
Park Headquarters
Riley Creek
Fang Mountain
Riley Creek
Refuge Valley
Mount Pendleton
Easy Pass
Foggy Pass
Windy Creek
Bull River
Costello Creek
West Fork
ALASKA RANGE

Legend
Bridge
Rest Area
Paved Road
Unpaved Road
Railroad
River
Lake
Ice Mass
Bureau of Land Management
Denali State Park
Park Boundary
National Park
National Preserve
National Park & Wilderness
0 2.5 5 10 Miles

Figure 2. Park Road Map

Denali National Park & Preserve

U.S. Department of the Interior National Park Service
DSC Planning Division - March 2011

NEED FOR ACTION

The present approach for managing vehicles on the Park Road is based on the park's 1986 general management plan, as amended, which established an allowable seasonal limit of 10,512 vehicles on the Park Road past mile 15 from approximately Memorial Day to a week after Labor Day. While the overarching goal of the limit was to protect wildlife viewing opportunities and wildlife health and habitat, the limits were not connected to more refined desired conditions in a logical framework that could be measured and monitored over time.

Although the vehicle limit is clearly measurable, it is less clear that a numerical limit alone is enough to adequately protect park resources and provide for a high-quality visitor experience. Other factors might affect park resources as indicated by a multidisciplinary road study that began in 2006 to expand understanding of the impacts of traffic volume and traffic patterns on the park's physical, biological, and social environment (see the "Planning Background" section in this chapter for information about this road study). These factors include visitor perceptions of crowding at wildlife stops and rest stops, interactions between buses and wildlife, and the patterns of wildlife movements along the Park Road corridor. In addition, there is a growing demand for the Park Road experience; trends indicate that visitation to Alaska and the Denali area will continue to increase (see the discussion in the "Planning Background" section of this chapter).

As a result, this plan is needed to set measurable indicators and standards that would ensure key park resources and values along the Park Road are adequately protected in accordance with desired conditions, especially in light of the potential for increased visitation. These resources and values include (1) wildlife populations, habitat, and the processes and components of the park's natural ecosystem; (2) wilderness character and values, and wilderness recreational opportunities; (3) the scenic and geologic values of Mount McKinley and the surrounding mountain landscape; (4) visitor enjoyment; and (5) the inspiration visitors derive from the park's natural features and opportunities to observe wildlife in its natural habitat. Additionally, an adaptive management approach, which employs more sophisticated science and modeling and monitoring techniques to effectively protect resources and provide a high-quality visitor experience, is needed to allow park managers the flexibility to adjust operations in response to observed resource protection or visitor use issues.

PLANNING GOALS AND OBJECTIVES

The goals and objectives further articulate what would be accomplished with the park's transportation system. The goals describe what would be achieved, and the objectives list specific outcomes for the goals.

Goal 1: Protect the exceptional condition of the park's resources and values through informed, proactive, and transparent management.

Objectives:

- Manage the transportation system to ensure protection of wildlife populations, wildlife habitat, and the processes and components of the park's natural ecosystem.
- Manage the transportation system to ensure protection of wilderness character, wilderness resource values, and wilderness recreational opportunities.
- Continue to protect and promote the historic character of the Park Road and related elements of the cultural landscape.
- Share monitoring findings with the public and inform them of management actions regarding the transportation system.

Goal 2: Provide high-quality and appropriate visitor opportunities on the bus.

Objectives:

- Ensure a transportation system that provides the park's interpretive themes and messages to all visitors as a means to encourage public understanding and support of park resources and values.
- Ensure a transportation system that provides a high-quality opportunity for viewing scenic landscapes and wildlife in a wilderness context.
- Provide a bus environment that enables visitors to engage with the park resources and values in a meaningful way.

Goal 3: Provide access to recreational and educational opportunities along the Park Road.

Objectives:

- Provide freedom of movement.
- Provide a system that is universally accessible and able to accommodate visitor needs and equipment.

Goal 4: Make the park transportation system understandable and user friendly.

Objectives:

- Clearly communicate information about the system through a variety of means.
- Enable visitors to easily choose the experience that meets their needs within the limits of the system.
- Ensure the transportation system enables visitors to spend time at an NPS visitor center.

Goal 5: Provide a transportation system that meets visitor access needs.

Objectives:

- Optimize seating capacity within the system design.
- Maximize system flexibility to meet future visitor demand, while

sustaining desired resource conditions and visitor experiences.

- Provide stability and predictability in the system.
- Develop a system that is affordable and offers opportunities for the full range of park visitors.

Goal 6: Provide access for subsistence use and inholders.

Objectives:

- Provide legally required access to Kantishna inholdings.
- Provide legally required access to subsistence users.

PLANNING BACKGROUND

The Denali Park Road was built in the 1920s and 1930s with bus service provided by a concessioner since the mid-1920s. Since it was established, a tour opportunity has been offered on the Park Road as part of this service. Although visitation was relatively low before 1972, visitation rose quickly after that time in direct response to the opening of the George Parks Highway, which linked the park to Anchorage and Fairbanks. Park managers instituted a mandatory visitor transportation system at the time to minimize disturbances to wildlife and scenery anticipated by the upsurge in visitors.

To protect wildlife and habitat, the wilderness character along the Park Road, and wildlife viewing opportunities, the 1972 transportation system allowed only those visitors with interior campground or other special use permits to drive their personal vehicles beyond the Savage River at mile 15. Visitors without permits were required to turn around at the Savage River or take a bus. Visitors had the option of taking a narrated bus tour or a shuttle bus that allowed them to get on and off. Visitation continued to steadily climb to approximately 394,000 annual recreational visits by the early 1980s.

A regulation promulgated in 2000 clarified that the seasonal limit of 10,512 vehicles on the Park Road past mile 15 (Savage River Check Station) — instituted by the 1986 general management plan — applies to the period described as "Saturday of Memorial Day weekend and continues through the second Thursday following Labor Day or September 15, whichever comes first" (36 CFR 13.932). For the regulated period, often termed the "allocation season," three possible lengths are based on the definition: 110 days, 111 days, and 116 days. Because of the way the definition is structured, most allocation seasons will have 111 days, with only occasional years having a 110- or 116-day season.

There is no defined vehicle capacity for the "shoulder seasons" except for a limit on the number of tours. The spring shoulder season is the time between snow removal on the eastern portion of the Park Road and the beginning of the allocation season. The fall shoulder season begins the day after the conclusion of the allocation season and continues until snow conditions no longer allow travel to Teklanika Rest Stop or Savage River.

This seasonal limit has served well for many years as a means to manage vehicle use and provide quality visitor opportunities. However, the consistent growth in tourism that Alaska has experienced over the last decade has directly corresponded to increasing visitation to Denali National Park and Preserve. The park has become one of the most visited subarctic national parks in the world. In 2007 more than 450,000 visitors arrived at Denali, the highest annual visitation recorded at the park to date. Visitors primarily come during the summer season and focus their time at the park on daylong tours along the Park Road or use the road as a means of accessing backcountry camping/hiking destinations or inholdings. Most visitors interested in a tour can be accommodated, but there are days and times when the demand for tours has exceeded the supply available.

In addition to the seasonal vehicle limit, the 1986 general management plan established four major zones in the park: natural zone, historic zone, park development zone, and special use zone. The Park Road corridor was placed in the park development zone, which provided for major development and intensive use. The 1986 general management plan was amended by the 1997 *Entrance Area and Road Corridor Development Concept Plan*

*(*1997 DCP) that further defined the Park Road into the following subzones (see figure 3)[1]:

- Motorized Sightseeing Subzone 2 (Park Road from George Parks Highway to park headquarters). The subzone provides access to developed and administrative areas, and permits some commercial vehicle use. Viewing wildlife and scenery primarily from a vehicle are among the principal activities in the subzone.
- Motorized Sightseeing Subzone 3 (headquarters to Savage River Bridge). Viewing wildlife and scenery primarily from a vehicle are the principal visitor use activities. Commercial vehicles are restricted from operating in the subzone.
- Wildlife Viewing Subzone 1 (Savage River Bridge to Teklanika River Bridge). The subzone includes part of the gravel section of the Park Road on which the primary purposes are viewing wildlife and scenic landscapes. Visitors travel on one of the bus systems and private vehicles are restricted. Other than the Park Road, the only facilities are rest areas spaced at approximately one-hour travel intervals. Visitors can expect to encounter a greater level of traffic in this subzone compared to the Wildlife Viewing Subzone 2.
- Wildlife Viewing Subzone 2 (Teklanika River Bridge to the former park boundary north of Wonder Lake). The subzone includes the gravel section of the Park Road on which greater restrictions (Rules of the Road) apply. Buses are given the right-of-way and the primary visitor use purposes are viewing scenic landscapes and wildlife. Visitors must use one of the bus systems and private vehicles are restricted. Facilities consist of the Park Road, one or two visitor contact stations, and generally one rest area for every hour of travel. Visitors can expect to encounter a lower level of traffic than in Wildlife Viewing Subzone 1.

The 1997 DCP retained the seasonal 10,512 vehicle limit, established daily limits for tour and transit operations, and increased the seasonal allocation to 550 buses while reducing the number of professional photographer permits. The plan also committed the park to move toward identifying user capacity of the road by setting indicators and standards for desired conditions. These efforts subsequently led to the park's 2006 road study to provide a better understanding of the impacts of traffic on park resources and visitor experience by further developing and refining the range of appropriate indicators for desired conditions. The road study was comprised of the following three primary components:

- Natural resource studies – Researchers documented the movements of grizzly bears (*Ursus arctos horribilis*) and Dall sheep (*Ovis dalli dalli*) using global positioning system (GPS) collars. The location and movement information of collared animals was modeled using habitat and traffic data to determine possible relationships between vehicles on the Park Road and wildlife behavior.

[1] Motorized Sightseeing Subzone 1 was applied to the portion of the George Parks Highway that passes through the park boundary, but not to the Park Road. Please see the 1997 DCP for additional details on this subzone.

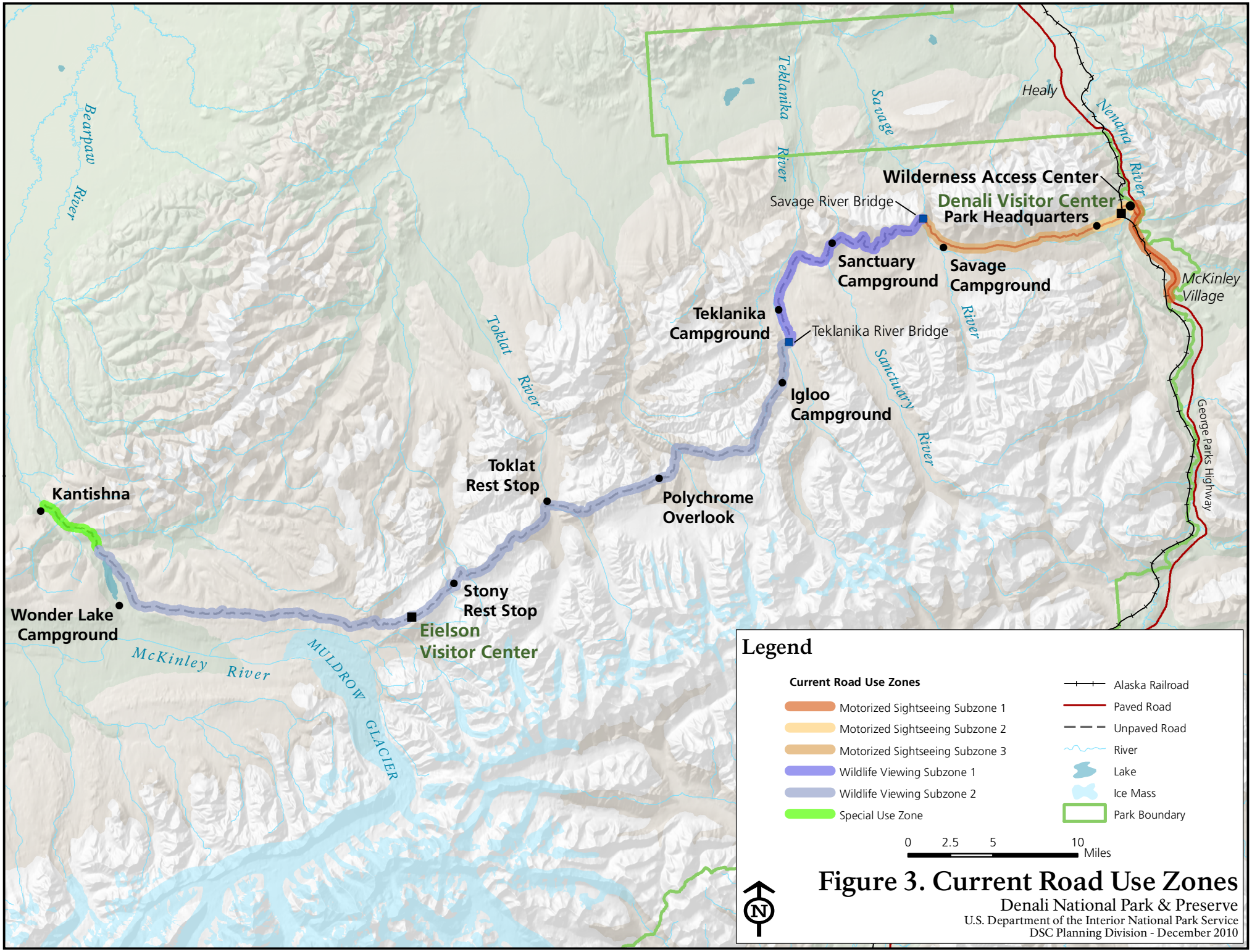


Figure 3. Current Road Use Zones

Denali National Park & Preserve

U.S. Department of the Interior National Park Service

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- Social science studies – Researchers administered visitor surveys to identify and assess key elements of the visitor experience on the Park Road.
- Logistical studies – Researchers used GPS data collected from vehicles driving the Park Road in 2006, 2007, and 2008 to create a traffic model capable of simulating location and vehicle-specific driving behaviors.

Information gathered from these studies has been combined to generate a model of Park Road traffic that would enable managers to predict the effects of changes in traffic volume and timing on visitor experience and wildlife movements. This model was then used to assist in the identification and selection of best management practices for vehicle schedules and user capacity on the Park Road, and to help identify potential impacts associated with the alternatives.

PARK PURPOSE

Purpose statements convey the reason(s) for which a national park unit was set aside as part of the national park system. Grounded in an analysis of park legislation and legislative history, purpose statements also provide primary criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested — they provide the foundation for a park's management and use.

In 1917, Congress established Mount McKinley National Park as a "game refuge" with the intent that it be "set apart as a public park for the benefit and enjoyment of the people" (39 Statute 938).

In 1980, Congress passed the Alaska National Interest Lands Conservation Act (ANILCA, Public Law 96-487), which enlarged and renamed the park Denali National Park and Preserve. Section 101 of ANILCA describes the broad purposes of the conservation system units established under the act, including the enlarged national parks and preserves such as Denali. These purposes include the following:

- Preserve lands and waters for the benefit, use, education, and inspiration of present and future generations.
- Preserve unrivaled scenic and geological values associated with natural landscapes.
- Maintain sound populations of, and habitat for, wildlife species.
- Preserve extensive, unaltered ecosystems in their natural state.
- Protect resources related to subsistence needs.
- Protect historic and archeological sites.
- Preserve wilderness resource values and related recreational opportunities such as hiking, canoeing, fishing, and sport hunting.
- Maintain opportunities for scientific research in undisturbed ecosystems.
- Provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so.

Section 202 of ANILCA states that the new land additions of Denali National Park and Preserve are to be managed for the following specific purposes:

- To protect and interpret the entire mountain massif and the additional scenic mountain peaks and formations.
- To protect habitat for and populations of fish and wildlife including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans, and other waterfowl.

- To provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities.

Under the authority of the Wilderness Act of 1964, section 701 of ANILCA also included designation of the Denali Wilderness consisting of approximately 1.9 million acres (now mapped at 2.1 million acres). About 99% of the former Mount McKinley National Park was included in the wilderness designation. Generally excluded from wilderness are those lands less than 150 feet from the centerline of the Park Road, plus wider areas at campgrounds, visitor centers, and maintenance areas. In accordance with the Wilderness Act, wilderness lands are to be "administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness…and for the gathering and dissemination of information regarding their use and enjoyment as wilderness."

PARK SIGNIFICANCE

Statements of park significance define what is most important about the park's resources and values and are based on the purpose for which the park was created. These statements describe the distinguishing resources and characteristics that set a park unit apart in a regional, national, and sometimes international context. The 2006 *Denali National Park and Preserve Backcountry Management Plan* provides detailed park significance statements that are abbreviated as follows:

- Large Protected Area – The 6 million acres of the park enable a spectacular array of flora and fauna to live together in a healthy natural ecosystem and provide excellent opportunities to study subarctic ecosystems in settings largely undisturbed by humans.
- Mountains and Glaciers – The park contains a major portion of the Alaska Range, one of the great mountain uplifts in North America, including North America's highest peak, Mount McKinley, and some of the largest glaciers in North America.
- Wildlife and Habitat – While populations fluctuate, nowhere else in North America can such concentrations of large species of wildlife be observed in such an accessible natural setting. The park is also significant for its diverse avian habitat and rich and varied vegetation. Denali has more than 10,000 mapped lakes.
- Scenic Resources and Air Quality – Outstanding views of natural features, including mountains, glaciers, faults, and rivers, dominate the park landscape. Denali National Park and Preserve is a designated Class I airshed under the Clean Air Act amendments.
- Cultural Resources – More than 250 known cultural resource sites are within Denali's boundaries, including both prehistoric and historic sites. Because cultural resource inventories have been limited to date, this number likely represents a small fraction of the park's total sites.
- Mountaineering – Mount McKinley is considered one of the world's premier mountaineering destinations, drawing climbers from many countries. Many other peaks in the park, including Mount Foraker, also offer outstanding expeditionary climbing opportunities.
- Wilderness Recreation – Denali offers superlative opportunities for primitive

wilderness recreation. This huge park contains large areas with almost no trails and where evidence of human use is minimal to nonexistent. A large portion of Denali's backcountry is readily accessible to visitors who can reach the park by highway or railroad from either Anchorage or Fairbanks.

FUNDAMENTAL RESOURCES AND VALUES

Denali National Park and Preserve's fundamental resources and values are derived from the park's purpose and further articulate those resources and values that Congress identified specifically for the park. They represent the systems, processes, experiences, scenery, sounds, and other features that are critical to achieving the park's purposes and maintaining its significance. These fundamental resources and values are summarized as follows:

1. wildlife populations, wildlife habitat, and the processes and components of the park's natural ecosystem
2. wilderness character, wilderness resource values, and wilderness recreational opportunities
3. scenic and geologic values of Mount McKinley and the surrounding mountain landscape
4. visitor enjoyment and inspiration from observing wildlife in its natural habitat and other natural features

Other important resources and values exist at the park that are not fundamental or primary to the park's purpose and significance, but are nevertheless important for both park management and visitors. The park protects and preserves these resources under applicable laws and NPS policies and guidelines, which include the following:

1. historic, archeological, and ethnographic resources
2. paleontological resources
3. air quality
4. subsistence resources and opportunities
5. scientific research, education, and interpretation about natural ecosystems and geologic features and processes

ISSUES AND IMPACT TOPICS

Issues and impact topics reflect the problems, opportunities, and concerns regarding current and potential vehicle management actions and strategies included in this plan / environmental impact statement. The issues and concerns addressed in this plan are derived from the comments and feedback provided by the public and park staff through the scoping process. This process included public meetings in the fall of 2008 that were part of the initial scoping process, as well as alternatives scoping, including public meetings, in the winter of 2009–2010. A summary of the comments received during scoping are included in chapter 5 of this plan.

Impact topics are a more refined set of concerns analyzed for each of the management alternatives. The impact topics were derived from the issues identified during scoping, and were used in chapter 4 to examine the extent to which a resource would be affected by the actions of a particular alternative. Some issues and impact topics were eliminated from further consideration by the planning team. In some instances, the issue or topic was dismissed because it related to resources that are not present in the park. In other instances, potential impacts were considered minimal, so those topics were also dismissed from further analysis.

Table 1 identifies impact topics that have been considered for this plan / environmental impact statement, including identification of the issues associated with the impact topic, as well as the rationale for retaining or dismissing the topic.

Several other possible impact topics included in NPS management guidelines, CEQ guidelines, and other federal laws were considered while assessing the environmental impacts of proposed actions. Just like the impact topics listed in table 1, these additional topics were considered for inclusion in this plan.

In addition to those topics described in table 2, other topics were dismissed from further consideration due to their lack of relevance to the plan, the Park Road corridor, or the impacts of the alternatives:

- Museum Collections (there would be no impact on how museum collections are acquired, accessioned and cataloged, preserved, protected, or made available for access and use)
- Archeological Resources (there would be no ground-disturbing activities that would affect buried sites, and any changes in visitor use patterns would have negligible effects)
- Environmental Justice (anticipated impacts associated with vehicle management under the alternatives would not disproportionately affect minority or low-income populations)
- Prime and Unique Farmlands (there are no such farmlands in the state of Alaska)
- Marine or estuarine resources (there are no such resources in the park)
- Geohazards (none of the alternatives would affect or would be affected by geohazards)

Table 1. Summary of Impact Topics Retained for Analysis

Impact Topic	Issues/Rationale for Retaining	Relevant Law, Regulation, or Policy
Visitor Use and Experience	The Denali Park Road is the primary means by which visitors access a variety of park features, sites, and experiences. As a result, some characteristics of visitor use and experience would potentially be altered by changes in vehicle management along the road, including • The ability to access wilderness recreational opportunities, and other park features, via the Park Road; • The diversity of opportunities once in the park; • The interpretive experience; • Safety and comfort; and • The opportunity for an affordable park experience. Given visitor use and experience is an integral element of the management of the Park Road, any changes could have beneficial or adverse effects.	Enabling legislation; NPS *Management Policies 2006;* NEPA regulations at 40 CFR 1508.27 require that the intensity of potential impacts be evaluated in terms of potential adverse effects on public health and safety
Transportation System and Traffic (including vehicle mix, restrictions, traffic, parking, transit service, and tours)	This plan may affect the mix of tour and transit services provided by the transportation system, and their schedules. Also, the mix of system and nonsystem vehicle use on the road may be affected. Changes in traffic volume and vehicle type may be anticipated along portions of the road and the plan may affect parking, rest stop, and turnaround area configurations.	
Wildlife and Wildlife Habitat	Wildlife and wildlife habitat issues have been identified based on the following six topics: • Dall sheep • grizzly bear • caribou • moose • gray wolf • other wildlife species and habitat The first five species were selected because (1) the Park Road runs through their respective habitats, (2) they are all considered fundamental resources and values that support the park's purpose and significance statements, (3) each could be adversely affected by human and vehicle use of the Park Road in their own unique way, and (4) they are all prominent attractions for the park visitors who use the transportation system on the road to view wildlife. Other wildlife species, including those that are of management concern and that use habitat along the road corridor also have important roles in the park's ecological system; therefore, they are also analyzed in this plan.	NPS Organic Act; NPS *Management Policies 2006*

Impact Topic	Issues/Rationale for Retaining	Relevant Law, Regulation, or Policy
Wilderness	The park's wilderness boundary lies 150 feet from the centerline of the Park Road (on both sides), and typically 300 feet from the perimeter of any development along the Park Road. Because of this proximity, the park's wilderness character—its naturalness, undeveloped nature, opportunities for solitude, and opportunities for primitive and unconfined recreation—may be affected by the volume, timing, and types of vehicle use on the Park Road associated with the plan alternatives. Some of the possible impacts on wilderness character from implementation of the alternatives include vehicle noise, concentrated pedestrian activity along boundaries (e.g., near transportation nodes), social trails, and altered wilderness viewsheds (e.g., vehicles on road).	Wilderness Act; Director's Order (DO)-41; NPS *Management Policies 2006*
Park Management and Operations (including park and concession employees, staffing)	This plan may bring about changes in bus numbers, scheduling, spacing, and pricing that could alter concession operations and staffing. Other alternative elements—such as changes to administrative use of the road, monitoring of indicators and standards, and changes to education/interpretation—would affect park operations, management, and costs. Minimum standards for bus drivers (e.g., education/interpretation and safety training) would change requirements for concession employees.	NPS Organic Act; Department of the Interior (DOI) Departmental Manual; NPS *Management Policies 2006*; DO-80
Socioeconomics	The social and economic conditions of the local gateway and regional communities, including residents and businesses, could be influenced by the actions taken to manage vehicle use along the Park Road. In addition, the cruise ship industry and the Alaska Railroad are dependent upon the park for portions of their businesses. As a result, the quality of life benefits, as well as demographic and economic trends of the area, could be affected by this plan.	National Environmental Policy Act

Table 2. Summary of Impact Topics Dismissed

Impact Topic	Issues/Rationale for Dismissing	Relevant Law, Regulation, or Policy
Sustainability (includes greenhouse gas emissions; natural and depletable resource requirements, energy requirements, and conservation potential)	Although the fossil fuel use associated with the existing transportation system contributes a notable amount to the park's carbon footprint, there would be minimal variation expected in the fossil fuel use among the alternatives. Additionally, there would be only a negligible to minor incremental increase in greenhouse gas emissions that would add to the park's overall carbon footprint. In addition, across all alternatives, the park would seek opportunities to reduce fossil fuel consumption via the use of alternative energy vehicles and other fuel-saving policies. Based on the limited effect of the alternatives on air quality and the park's carbon footprint, this impact topic has been dismissed from further analysis. Although this impact topic has been dismissed, the adverse effects of dust and vehicle emissions will be considered when analyzing the retained wilderness character and visitor use and experience impact topics due to their potential effects on pedestrians and bicyclists.	
Invasive Species	Vehicle use on the Park Road, especially use of construction equipment, has been the predominant means for many of the park's nonnative invasive plants to enter the park. However, the threat of invasive plants is expected to decrease over time due to (1) the park's current management action of regularly washing buses, park vehicles, and construction equipment; (2) the likelihood of private vehicle use on the Park Road remaining constant or decreasing over time; and (3) implementing guidance in the NPS Alaska Region's *Plan / Environmental Assessment for Managing Invasives* (NPS 2009a). This plan would have no more than minor effects on the spread of invasive plant species in the park; therefore, this topic was dismissed from detailed analysis.	
Vegetation (including rare or unusual vegetation)	Vegetation immediately along the Park Road is affected by dust generated by vehicles traveling on the road, and may be affected by the calcium chloride ($CaCl_2$) dust palliative that is used to control dust generated from Park Road vehicle use. However, park staff have already initiated a chloride monitoring program in soils and waters adjacent to the road that (1) measures the $CaCl_2$ effects on vegetation (if any), and (2) provides an early warning system that would alert staff to modify or cease $CaCl_2$ application levels to avoid vegetation impacts. At the projected levels of vehicle use under this plan, including under the no-action alternative, this monitoring would ensure no more than minor and localized effects on the structure and diversity of the park's vegetation communities. In addition, the park would continue to pursue new ways to address the dust issue (e.g., traffic volume and new applications).	NPS *Management Policies 2006*; DO-77
Threatened and Endangered Species	No federal- or state-listed threatened or endangered species reside in Denali and none are anticipated to be affected by the proposed vehicle management plan alternatives. Likewise, no federally designated critical habitat exists in the park. Although rare and unique plant species are found in the park, these plant species do not exist in vicinity of the Park Road corridor and would not be affected by any of the vehicle management plan alternatives; therefore, this topic was dismissed from detailed analysis.	Endangered Species Act; Migratory Bird Treaty Act; NPS *Management Policies 2006*

Impact Topic	Issues/Rationale for Dismissing	Relevant Law, Regulation, or Policy
Soils and Geologic Resources	While localized effects could result from transportation node development that may be prompted by this plan, this development would be located and designed in a way that avoids or mitigates adverse impacts on soils and geology. Assuming the alternatives would not yield a large variation (increase or decrease) in motorized vehicle volumes on the Park Road, the associated dust, the necessary calcium chloride ($CaCl_{2)}$) dust palliative applications, and road maintenance work would also have no more than minor impacts on local soils and geologic resources under any of the alternatives. As a result, this impact topic was dismissed from further consideration.	NPS *Management Policies 2006*
Water Resources and Hydrologic Processes (including stream character, water quantity and quality, watershed processes, wetlands, and floodplains)	Although the past road construction and road maintenance have had effects on water resources (e.g., where the road crosses drainages or wetlands), none of the proposed alternatives would alter the design, alignment, or maintenance standards of the road. As a result, there would be no effects on stream character, water quantity, wetlands, or floodplains. The $CaCl_2$ dust palliative that is applied to control dust generation from Park Road vehicle use may migrate to adjacent water bodies. However, park staff have already initiated a $CaCl_2$ monitoring program in soils and waters adjacent to the road. At the projected levels of vehicle use under this plan, including under the no-action alternative, this monitoring would ensure no more than minor and localized effects on water resources. As a result, this topic was dismissed from further consideration.	Clean Water Act; Executive Order (EO) 12088; EO 11990; EO 11988; NPS *Management Policies 2006*; DO-77-1; DO-77-2
Air Quality	Since air quality monitoring at Denali began in 1980, the park typically has one of the best air quality conditions in the U.S., which upholds its designated Class I status (the most protected status) under the Clean Air Act. Although the emissions from internal combustion engine vehicles and the dust generated by traveling on the gravel road surface may have limited, localized adverse impacts on air quality, they would not cause national ambient air quality standards to be exceeded. Overall, the projected levels of managed vehicle access under this plan would have no more than minor adverse impacts on air quality under any alternative; therefore, this topic has been dismissed from further consideration. However, the dust and localized exhaust generated by these vehicles may have minor, adverse effects on the visitor experience (e.g., bicyclists on the road).	Clean Air Act; EO 13423; DOI Secretarial Order 3226, Amendment No. 1; NPS *Management Policies 2006*
Lightscape (dark night sky preservation)	All proposed alternatives for vehicle management along the Park Road would concentrate and assign the majority of vehicle use during daylight hours. Although the potential for managing some activities (e.g., contractor and NPS employee access) to minimize displacement of visitors could in turn change the amount of vehicle use during dark evening or night hours, indicators associated with the night driving would ultimately limit the amount of vehicles on the road during these times. As a result, impacts on lightscapes would be no more than minor; therefore, this topic has been dismissed from further consideration.	NPS Organic Act; NPS *Management Policies 2006*

Impact Topic	Issues/Rationale for Dismissing	Relevant Law, Regulation, or Policy
Soundscape (natural sound preservation)	The existing acoustic environment of Denali National Park and Preserve consists of both natural ambient sounds and human-induced noises such as those associated with motorized vehicles on the Park Road (for visitors and park operations) and those associated with airplanes. These existing noises have intermittent and localized adverse effects on the acoustic environment of the park. However, assuming the alternatives would not result in a large variation in motorized vehicle volumes or frequencies on the Park Road, the anticipated change in the soundscape and acoustic environment would be relatively minor. Although, this impact has been dismissed, the adverse effects on soundscapes will be considered when analyzing other retained impact topics, such as wildlife, wilderness character, and visitor use.	NPS Organic Act; NPS *Management Policies 2006*; DO-47
Cultural Resources (including historic buildings and structures, ethnographic resources, and cultural landscapes)	Historic buildings and structures, ethnographic resources, and cultural landscapes were dismissed from detailed analysis for the reasons listed below. Should additional cultural resources be discovered or uncovered along the Park Road corridor in the future, park staff will take appropriate measures to document and preserve the resources, and pursue appropriate consultations with agencies, tribes, and other interested parties. **Historic Buildings and Structures.** The historic 92-mile Park Road, the historic roadside, and the backcountry log patrol cabins have a Determination of Eligibility for the National Register of Historic Places. The backcountry log patrol cabins largely retain their rustic character from their respective periods of significance. The Park Road's period of significance extends from initial construction (1922–1938) to the present. The road's historical integrity with regard to materials and workmanship associated with its original construction has been diminished in part because of resurfacing and the replacement of bridges and culverts. However, the road retains substantial integrity with regard to location, design, setting, feeling, and association. The route remains largely unchanged with only a few minor alignment modifications. The first 30 miles of the road reflect design and safety improvements carried out primarily in the 1960s under the NPS Mission 66 Program (i.e., paved from the park entrance to the Savage River, then widened but gravel-surfaced from the Savage River to the Teklanika River). Subsequent curtailment of Mission 66 improvements is evident beyond Teklanika as the road progressively narrows and becomes more primitive as it leads towards the Eielson Visitor Center and eventually reaches Kantishna. The park maintains the road in a manner that preserves the integrity of setting along the route and provides visitors with rustic travel experiences and opportunities to view the surrounding landscape from the road (Determination of Eligibility for the National Register of Historic Places – Denali Park Road 2009). Although possible increases in road use and visitation associated with this vehicle management plan may necessitate additional monitoring and maintenance, there would be no construction that would alter the character-defining features of the road or the log patrol cabins along the route. **Ethnographic Resources.** Ethnographic resources are traditional sites, structures, objects, landscapes, natural resources, and other material features associated with cultural systems or ways of life.	National Historic Preservation Act; NPS *Management Policies 2006*; NPS-28, "Cultural Resources Management"; National Environmental Policy Act; Secretarial Order 13007

Impact Topic	Issues/Rationale for Dismissing	Relevant Law, Regulation, or Policy
Cultural Resources (including historic buildings and structures, ethnographic resources, and cultural landscapes) (continued)	Ethnographic studies in the park have identified many hunting and fishing campsites, village locations, and trails with cultural and traditional importance to those with tribal associations to the earliest park inhabitants. However, the vehicle management planning alternatives do not entail new construction or ground disturbance, and are not anticipated to impede access to places of traditional religious, ceremonial, or other customary activities. Regardless, the park will consult with associated tribal members to assess and, as necessary, minimize any possible disturbance to resources or values important to the tribes that could result from the project actions. **Cultural Landscapes.** A cultural landscape is an area where cultural values and traditions of human adaptation and natural resource use is demonstrated, often via patterns of settlement, land use, circulation, and the types of structures that are built. Some cultural landscapes have been, or are in the process of being, identified and documented along the Park Road corridor (park headquarters historic district and Kantishna area, respectively). Although a cultural landscape report for the historic Park Road has not been completed, it is anticipated that actions proposed by this plan would negligibly affect the character-defining cultural landscape features likely to be associated with the road corridor (e.g., spatial organization, land use patterns, circulation systems, topography, vegetation, buildings and structures, small-scale features, and views and vistas). Other than anticipated plan actions that could possibly change the distribution and numbers of buses and vehicles using the Park Road, there would be no alteration of the road prism itself or construction that could introduce new elements into the viewshed of the cultural landscape.	
Subsistence	ANILCA permits local residents to engage in subsistence uses within the 1980 additions to Denali "to provide the opportunity for local, rural residents engaged in a subsistence way of life to continue to do so." However, the majority of the road corridor planning area is located outside of park lands and waters that are used for subsistence activities (primarily in northwestern portions of the park near Lake Minchumina and southeast park additions near Cantwell). None of the actions proposed by this plan would impede traditional access to park resources by subsistence users. In addition, the plan would be consistent with the park's *Subsistence Management Plan* that was prepared in cooperation with the Denali Subsistence Resource Commission. As a result, this topic has been dismissed from further consideration. An 810(a) analysis is attached as appendix A.	ANILCA; NPS *Management Policies 2006*

- Conformity with local land use plans and other federal, state, or local laws for the protection of the environment (the Park Road study area for this plan / environmental impact statement occurs entirely within the boundaries of Denali National Park and Preserve and no actions are proposed that would conflict with local land use plans; none of the alternatives would cause violations of any other federal, state, or local laws for the protection of the environment)
- Urban Quality and Design of the Built Environment (there are no urban areas within or near the Park Road study area, and the preferred alternative would not affect the design of the built environments along the road corridor, including the entrance area)
- Wild and Scenic Rivers (none exist within the project area)
- Unique Ecosystems, Biosphere Reserves, World Heritage Sites (there are no World Heritage Sites in the park, and although it is designated as a Biosphere Reserve, the alternatives would not impact this designation)
- Indian Trust Resources (none exist within Denali National Park and Preserve)

LAWS, REGULATIONS, AND POLICIES

While this document explores different approaches to the management of vehicle use on Denali Park Road, many management directives are specified in laws and policies guiding the Park Service overall and are not subject to alternative approaches. This section identifies some of those directives.

GENERAL DIRECTION FOR PUBLIC ENJOYMENT AND RESOURCE PROTECTION

The National Park Service Organic Act of 1916 (16 USC §§ 1–4, 39 Statute 535)

The Organic Act establishes the National Park Service and directs the agency to

> *. . . promote and regulate the use of the Federal areas known as national parks, monuments, and reservations. . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*

Importantly for all planning processes in the national park system, the Organic Act provides a fundamental standard for management—that park resources should remain "unimpaired" for the enjoyment of future generations.

Redwood National Park Expansion Act of 1978 (16 USC §§ 1–1a, 92 Statute 166)

The Redwoods Act amends the Organic Act and clarifies the importance Congress placed on protecting park resources such that

> *The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.*

National Environmental Policy Act of 1969 (42 USC 4321–4370d; Public Law 91-190)

The National Environmental Policy Act requires that federal agencies give proper consideration to applicable topics and issues of environmental concern (as well as economic, social, and other factors) prior to undertaking any action that could significantly affect the human and natural environment. Agencies are required to assess the direct, indirect, and cumulative beneficial and adverse impacts likely to occur from implementation of alternative courses of action. The act also directs federal agencies to employ a systematic, interdisciplinary approach in planning, and to consider public input and comments in decision making.

National Historic Preservation Act of 1966 (16 USC 470 et seq.)

The National Historic Preservation Act (NHPA) provides the framework for review and protection of cultural resources by federal undertakings, and ensures that they are considered during project planning and execution. The implementing regulations (36 CFR 800) for section 106 of the NHPA are administered by the Advisory Council on Historic Preservation. Cultural resources included in the national register, or

determined eligible for inclusion, are considered "historic properties" for the purposes of compliance with section 106. Section 106 requires federal agencies to identify and assess the effects of their actions on historic properties and to afford the advisory council an opportunity to comment. Agencies consult with appropriate state and local officials, Indian tribes, applicants for federal assistance, and members of the public when making final project decisions.

NPS *Management Policies 2006*, Section 1.4

NPS *Management Policies 2006* uses the terms "resources" and "values" to mean the full spectrum of attributes for which a park unit is established and managed, including the Organic Act's fundamental purpose and any additional purposes as stated in a park unit's establishing legislation. The impairment of park resources and values may not be allowed unless directly and specifically provided by statute. The primary responsibility of the Park Service is to ensure that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities to enjoy them.

The evaluation of whether impacts of a proposed action would lead to impairment of park resources and values is included in the "Environmental Consequences" chapter of this document. Impairment is more likely when there are potential impacts on a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

WILDERNESS MANAGEMENT

The Wilderness Act of 1964 (16 USC §§ 1131–1136, 78 Statute 890)

The 1964 Wilderness Act established the National Wilderness Preservation System and defined wilderness as follows:

> *A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean…an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which*

- generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
- may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Alaska National Interest Lands Conservation Act of 1980 (ANILCA, 16 USC 3101–3233)

ANILCA provides the following guidance about wilderness management at Denali:

- ANILCA section 101 lists "preserve wilderness resource values" as a fundamental purpose of the act.
- ANILCA section 102(13), states that the term "wilderness" as used in ANILCA has the same definition as in the Wilderness Act.
- ANILCA section 203(a) states that a fundamental purpose of the Denali National Park and Preserve additions is to provide continued opportunities, including reasonable access, for wilderness recreational activities.
- ANILCA section 1317 requires a wilderness suitability review and wilderness recommendations regarding the park additions and preserve lands added to Denali by the act.

In addition, ANILCA provides some exceptions to national park and wilderness management practice, including allowing appropriate use for subsistence purposes of other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulations (see ANILCA section 811).

NPS Management Policies, Chapter 6, Section 6.3.1

This document establishes that eligible and proposed wilderness on NPS lands should be managed under wilderness policy:

> *For the purposes of applying these policies, the term "wilderness" will include the categories of eligible, study, proposed, recommended, and designated wilderness. Potential wilderness may be a subset of any of these five categories. The policies apply regardless of category except as otherwise provided herein. In addition to managing these areas for the preservation of the physical wilderness resources, planning for these areas must ensure that the wilderness character is likewise preserved. This policy will be applied to all planning documents affecting wilderness.*

The Park Service will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time, management decisions will be made in expectation of eventual wilderness designation. This policy also applies to potential wilderness, requiring it to be managed as wilderness to the extent that existing nonconforming conditions allow. The Park Service will apply the principles of civic engagement and cooperative conservation as it determines the most appropriate means of removing the temporary nonconforming conditions that preclude wilderness designation from potential wilderness. All management decisions affecting wilderness will further apply the concept of "minimum requirement" for the administration of the area regardless of wilderness category. The only exception is for areas that have been found eligible, but for which, after completion of a wilderness study, the Park Service has not proposed wilderness designation. However, those lands will still be managed to preserve their eligibility for designation.

ACCESS TO INHOLDINGS

ANILCA Section 1110(b)

ANILCA section 1110(b) provides that inholders within park units in Alaska shall be given "…such rights as may be necessary to assure adequate and feasible access for economic and other purposes to [the

inholding]. . .subject to reasonable regulations issued by the Secretary to protect natural and other values of such lands."

PARK ROAD MOTOR VEHICLE PERMITS

Title 36 Code of Federal Regulations: Parks, Forests, and Public Property, Part 13-National Park System Units in Alaska, Subpart L—Special Regulations—Denali National Park and Preserve Motor Vehicle Permits

Title 36 CFR 13.932 authorizes the park superintendent to issue no more than 10,512 motor vehicle permits each year for access to the restricted section of the road from the Saturday of Memorial Day weekend through the second Thursday following Labor Day or September 15, whichever comes first. Each permit allows one vehicle one entry onto the restricted portion of the Park Road. This regulation would be revised if alternative B, C, or D described in this plan / environmental impact statement is selected.

RELATIONSHIP OF THIS PLAN TO OTHER GUIDANCE DOCUMENTS

RELATED PARK PLANS

In addition to this current vehicle management plan / environmental impact statement, the park has undertaken several other planning efforts that relate to the Denali entrance area and road corridor, traffic patterns and circulation, and visitor experience. Following is a summary of these plans at Denali National Park and Preserve. Other projects and actions along the Park Road are also described in the cumulative impacts scenario presented in chapter 4 of this document.

1986 General Management Plan, as Amended

A general management plan was completed for the park in 1986, and was then amended three times by the following:

- Entrance Area and Road Corridor Development Concept Plan (1997)
- South Side Denali Development Concept Plan (1997)
- Backcountry Management Plan (2006)

The extensive amendments replaced large sections of the 1986 general management plan. Each of the amendments included a complete environmental impact statement and used the public involvement process prescribed by the National Environmental Policy Act, including extensive public scoping, public hearings, and public comment on a draft plan. In the case of the backcountry management plan, there was public review two drafts.

The amended general management plan prioritizes implementation projects. Highest priority projects (level 1) include those related to immediate health and safety concerns and protection of threatened and endangered resources. Also included in this category are major actions designed to enhance the visitor experience and resource protection in the frontcountry and management actions that can be implemented without additional funding, such as regulatory changes. The park is currently implementing Level 1 projects, which could mitigate some of the impacts identified in the no-action alternative.

The amended general management plan also provides a concise history of park planning over the past 30 years. Plans relating to the road corridor and visitor use include the following:

- Environmental Assessment on the Park Road Rehabilitation Program (1982)
- Development Concept Plan / Environmental Assessment for the Park Road Corridor (1983)
- General Management Plan / Land Protection Plan / Wilderness Suitability Review (1986)
- Addendum to the 1983 Development Concept Plan / Environmental Assessment for the Park Road Corridor (1987)
- Environmental Assessment for the Repair of the Denali Park Road and Associated Visitor Use Areas from Park Entrance to Savage River Bridge (1988)
- Amendment to the 1983 Development Concept Plan / Environmental Assessment for the Park Road Corridor and 1987 Addendum for Riley Creek (1992)
- Road System Evaluation (1994)
- Environmental Assessment on the Proposed Construction of Visitor

Transportation System Facilities (1994)
- Entrance Area and Road Corridor Development Concept Plan / Environmental Impact Statement (1997)
- Environmental Assessment for Construction of New Visitor Facilities in the Entrance Area of Denali National Park (2001)
- Denali Education Plan

Denali National Park and Preserve Road Design Standards 2007 / The Denali National Park Road Maintenance, Repair and Operating Standards 2005

The design standards guide repairs of the Denali Park Road and work needed to achieve the desired service condition for the number, size, and design of vehicles the road is presently required to carry. The standards also provide quantitative guidance to the Federal Highway Administration in designing and engineering repair projects for the Park Road that do not change its unique character. This document identifies which maintenance and repair activities need subsequent management approval and additional NEPA compliance.

The purpose of these standards is to quantify the definition of "Road Character" and bring together in one document the crucial factors that affect the Park Road. The overall management goal is to preserve the unique character of the Denali Park Road and the visitor experience it provides.

A companion document, the *Denali National Park Road Maintenance, Repair and Operating Standards (March 2005),* describes the routine preventive maintenance activities and the repair and operating procedures employed to achieve the desired physical condition of the Denali Park Road. The maintenance standards include target levels for routine maintenance and repair activities. The standards also direct and establish the quantitative limits that these activities cannot exceed.

Road conditions proposed in the vehicle management alternatives of this plan comply with these standards.

Denali National Park Backcountry Management Plan / Environmental Impact Statement 2006

Denali's backcountry management plan updates and expands the 1976 backcountry management plan, and it amends the 1986 general management plan for the park. The backcountry plan addresses the major changes occurring in the backcountry, especially recreational uses that have increased significantly in the last 30 years. The plan addresses overnight camping, airplane landings, snowmobile use, hiking, climbing and mountaineering, nonmotorized winter activities, bicycle use, boating, sport hunting, trails, information facilities, shelters, campsites, and NPS administration and research. Plan goals are to continue providing for a range of visitor opportunities in the backcountry while protecting the internationally significant resources of the park and preserve. The intent is to manage growth so that in the long term, a greater number of users could experience the park with reduced resource impacts.

This plan addresses management of all park and preserve areas not included in the *Entrance Area and South Side Development Concept Plan*s, including the designated wilderness in the former Mount McKinley National Park, the national park additions, the northwest and southwest national preserve areas, and the Park Road corridor west of park headquarters during the winter season.

The preferred alternative in this plan provides for expanded recreational opportunities in many areas of the park and preserve for

activities that are particularly well suited to the unique character of Denali. When use levels grow to match the management vision for a particular unit, they would be capped. Patterns and types of use would be somewhat similar to current conditions, but increases in use levels would be noticeable at several locations. The record of decision was signed in January 2006. All of the alternatives developed for this plan are consistent with the backcountry management plan.

Denali National Park and Preserve Resource Stewardship Strategy 2008–2027 (2008)

The *Resource Stewardship Strategy 2008–2027* provides strategic guidance for the research, resource management, and resource educational programs of the Park Service at Denali. The resource stewardship strategy is a program planning document that serves as a bridge between the qualitative statements of desired conditions established in the park's general management plan and the measurable goals and implementation actions determined through park strategic planning. The resource stewardship strategy is an analytical document that focuses on identifying and tracking indicators of desired conditions, recommending comprehensive strategies to achieve and maintain desired conditions over time, and assessing and updating these comprehensive strategies periodically based on new information and the results of completed activities. Several of the strategies and related projects pertain to the entrance and road corridor. Also, consistent with this strategy, the action alternatives developed for this plan include indicators and standards for managing vehicles along the Park Road.

Denali Park Road Alternatives for Vehicle Management (2009)

This report examines alternatives for operation of bus service on the Park Road, surveys the transit bus market for alternatives to the existing Denali transit and tour vehicles, and develops a forecast of visitation to the park to help understand future demand for the service. The alternatives presented in this report explore several dimensions of vehicle management planning for Denali, including the following:

- types of bus service offered
- geographic extent of the service
- infrastructure requirements
- booking and reservation systems
- interpretive message delivery
- institutional and financial mechanisms
- financial implications
- park resource impacts

This report helped inform alternatives considered during the planning process and also provided baseline information for the affected environment of this plan / environmental impact statement.

A Predictive Study of Use Impact on the Denali Park Road: A Study Plan to Support Analysis and Management of Carrying Capacity. U.S. National Park Service, 2005–2012 (2005)

This study is designed to help support analysis and management of carrying capacity on the Denali Park Road. Qualitative and quantitative surveys of park visitors are being conducted to help inform indicators and standards of quality for the park experience and to measure visitor attitudes toward alternative park management practices along the Park Road, which are described in chapter 2 of this plan / environmental impact statement. The results also helped inform the affected environment for visitor use and experience.

NATIONAL PARK SERVICE PLANS

A Social Science Research Plan for the Alaska Region of the National Park Service 2006–2016

This report provides a blueprint for social science research in the Alaska Region of the Park Service. It represents an ambitious 10-year plan to prioritize the region's social science needs by 2016. The plan was prepared by the NPS Social Science Program and Texas A&M University in cooperation with the Alaska Region and the Protected Area Social Research Unit at the University of Washington. Its purpose is to:

- identify the needs for social science research in the NPS Alaska Region through 2016;
- propose a specific agenda of research projects and programs for the Alaska Region; and
- propose a strategy and budget to conduct the research.

Because of the number of parks in the NPS Alaska Region, it is impractical to detail the specific research needs of each unit. Instead, the plan focuses on overarching themes that provide umbrellas for park-specific research and for social science investigations at the national, regional, and state levels. These themes include the following:

- visitors and nonvisitors
- subsistence and traditional lifeways
- civic engagement
- human resources
- Alaska Region future project

The strategy also contains a review of existing social science literature. The plan's overarching research themes, and studies conducted as a result, could provide guidance in identifying the affected environment and environmental consequences for this plan.

NPS Alaska Region Climate Change Strategy 2008–2016 Draft for Review (Version 14, May 7, 2009)

The NPS Alaska Region Climate Change Strategy provides information about current and expected impacts of climate change in the Alaska Region and recommendations for addressing those effects. It outlines a vision for the NPS Alaska Region Climate Change Program (2009–2016), explains why climate change matters for managing national parks in Alaska, and describes how climate change affects NPS operations and resources. The effects of climate change on park resources and the visitor experience are considered in the affected environment of this plan / environmental impact statement.

The Alaska Natural Resource Program: A Strategy for the Future 2010 / The Alaska Natural Resource Program: Actions to Implement the Strategy (Plan) 2010

This strategy defines 10 focus areas and their goals. Specific actions or steps to achieving the goals are detailed in a companion document, *The Alaska Natural Resource Program – Actions to Implement the Strategy*. These will be measurable and tangible management actions, both park specific and regionwide, that are required to achieve the goals. The implementation plan will be a timely document, and revised as needed, possibly as often as annually, but otherwise every five years. The intention of an action item list is that it will be integrated into park and central office annual work plans. It is anticipated that the implementation plan would be drafted shortly after the strategy is finalized. The 10 focus areas and their goals include

- Condition of Park Natural Resources – fully develop and implement an inventory and monitoring program for Alaska parks

- Backcountry and Wilderness Areas – coordinate regionally to create an effective program and comprehensive management plans
- Ocean and Coastal Resources – develop knowledge sufficient to protect resources and processes through cooperative management strategies.
- Climate Change Response – develop a foundation of understanding to determine best alternatives for response.
- Collaborative Conservation – participate in ecosystem management opportunities at local, regional, national, and global levels.
- Visitor Use – develop methods to establish visitation goals and levels of use that balance visitor use with resource protection.
- Harvest of Natural Resources – provide opportunities for traditional and customary uses while maintaining natural and healthy populations.
- Living Laboratories – seek research opportunities and broadly share scientific results with visitors and educational institutions.
- Information Management – develop information management strategy to make new and existing data readily accessible.
- Fostering Professionalism – develop and support a professional workforce qualified in resource management and protection.

All alternatives developed in this document are consistent with this strategy and its companion implementation plan.



Chapter 2
The Alternatives

INTRODUCTION

The "Alternatives" chapter describes the various actions that could be implemented for future management of vehicles along the Park Road at Denali National Park, including the no-action alternative. Regulations implementing the National Environmental Policy Act (40 CFR 1502.14) require consideration of the no-action alternative, which in this document is the continuation of current vehicle management actions, as well as a range of reasonable alternatives. In addition, this chapter discusses the alternatives development process; the elements common to all action alternatives; user capacity and adaptive management, including indicators, standards, and monitoring; mitigation measures; development of the agency preferred alternative; the environmentally preferable alternative; alternatives that were considered but dismissed; and the consistency of the alternatives with the purposes of the National Environmental Policy Act.

These alternatives and their associated costs are described in this chapter and summarized in table 3. Please note that all costs are reported in current dollars and do not account for inflation over the life of the plan. In addition, costs are focused on those applicable to the Park Service for implementing an alternative, not the cost of concessioner operations.

DEVELOPMENT OF THE ALTERNATIVES

INTRODUCTION

The development of alternatives began with a public newsletter distributed in September 2008 and subsequent public open houses at which people were asked for their ideas related to alternative approaches for accomplishing the general project goals identified in the "Notice of Intent" to prepare an environmental impact statement. Please see chapter 5 for more details regarding this initial scoping process.

The public response was analyzed later in fall 2008, and was considered during refinement of the park's more detailed goals and objectives for the transportation system and related visitor experience (see chapter 1 for more information on desired conditions, goals, and objectives). In addition to public feedback, the Park Service considered why Denali National Park and Preserve was established by Congress (including examination of the park's purpose, significance, and fundamental resources and values), as well as guidance from other park plans and documents (e.g., *Road Design Standards*), in developing the goals and objectives.

In addition to public scoping, the park used information from recent visitor surveys and user comment cards to identify elements of the transportation system that visitors are satisfied with and elements that either need improvement or are not currently offered.

The next step in the process involved further articulating the goals and objectives of the plan by identifying indicators that would be used in adaptively managing user capacity. User capacity is an expression of an area's ability to provide for appropriate visitor use while sustaining desired resource conditions and visitor experience. Ultimately, these indicators would be monitored as long-term measures of success for managing user capacity and would serve as "triggers" for implementing adaptive management (see the "User Capacity and Adaptive Management" section of this chapter for more information about user capacity and indicators).

Park staff then began formulating strategies for how to manage the transportation system to meet the goals and objectives. Because the mission of the Park Service to provide both for long-term preservation and visitor use that can be accommodated while protecting park resources, strategies were considered that (1) maintain or enhance performance of the park's transportation system to better protect resources and meet visitor needs, and (2) are feasible to implement. The planning team subsequently packaged the various strategies in different ways to develop preliminary alternative concepts.

These preliminary alternative concepts, along with the preliminary goals, objectives, and approach to managing user capacity and adaptive management, were shared with the public in early 2010. This effort included a planning workbook that was mailed to interested parties and the presentation of another round of public meetings. People were asked to provide their feedback, which was then analyzed and considered as the planning team refined the alternatives. During this time, the planning team also developed the standards for each of the indicators noted above (see the "User Capacity and Adaptive Management" section of this chapter for more information about indicators and standards).

Together, these alternative concepts, approaches, and standards and indicators make up the management alternatives, also referred to as the "action alternatives," described in the remainder of this chapter. Also included herein is a description of current management conditions, representing

direction and trends based on the 1986 general management plan and subsequent amendments. The description of the current conditions serves as a basis of comparison with the two action alternatives and is referred to as the "no-action alternative."

The draft plan was shared with the public for a 90-day public comment period in fall 2011. Public comments were reviewed per NEPA and the NPS Planning and Public Comment (PEPC) procedures. A new action alternative, the agency preferred alternative D, was developed based on public comments and conversations with stakeholders. More information on the formation of the preferred alternative can be found later in this chapter in the "Identification of the NPS Preferred Alternative" section.

DEFINITIONS

During the alternatives development process, the Park Service identified three types of bus service that could be offered to visitors to tour the Park Road or to access points of interest and departure along the route: transit, economy tour, and premium tour. To help communicate the differences between the types of bus service, park staff developed the following definitions:

- Transit: A bus service with the primary purpose of providing access into the park for wilderness recreation, including photography, hiking, visiting overlooks, and camping. The transit system is intended for visitors who are seeking to get off the bus.
- Economy Tour: A bus service that provides a modest tour experience.
- Premium Tour: A bus service that provides a high-quality value-added tour experience that includes an interpretive program providing either a general overview of the park or a focus on a specific topic.

ACTIONS COMMON TO ALL ALTERNATIVES

Some activities related to vehicle management in Denali National Park and Preserve are common to all alternatives, including the no-action alternative (alternative A) and the three action alternatives (alternatives B, C, and D). These activities include mitigation measures and best management practices that would be applied to avoid or minimize potential impacts from implementation of the alternatives:

- The *2005 Denali National Park Road Maintenance, Repair and Operating Standards* and *2007 Denali National Park and Preserve Road Design Standards* would continue to apply.
- There would be no capital improvements associated with any of the alternatives; therefore, no additional costs associated with facility development or operations are anticipated.
- The Park Service would use alternative energy vehicles and other fuel-saving policies. Such measures would be addressed in the prospectus that will be issued for the new concessions contract.
- To reduce the threat of invasive plants, the park's current requirement to regularly wash buses and park vehicles would continue.
- Use of calcium chloride to control dust on the gravel section of the Park Road would continue unless its use is determined to be harmful.
- The park would continue to pursue new ways to address dust issues associated with vehicle traffic along the unpaved section of the road (e.g., use of water trucks, controlling traffic volume, and searching out new applications).
- All visitors, whether they are on a transit or tour bus, would have the opportunity to get off the bus and return east on the transit system.

ALTERNATIVE A: NO ACTION

GENERAL CONCEPT

Alternative A represents the existing conditions. Currently, vehicle use on the restricted section of the Park Road is managed to maintain a 10,512 seasonal limit that was set in the 1986 general management plan and then formalized in regulations in 2000 (36 CFR 13.932). The regulated season begins on the Saturday of Memorial Day weekend and continues through the second Thursday following Labor Day, or September 15, whichever comes first. Allocation for segments of the transportation system and other vehicle use were modified in the 1997 *Entrance Area and Road Corridor Development Concept Plan* and the *Superintendent's Compendium*.

A check station where staff count visitors and vehicles was established on the road at the Savage River in 1970; it was moved near the Savage campground a few years later and then moved back to the Savage River in 1990.

Resource monitoring and visitor surveys are conducted to address areas of concern but are not part of a formal adaptive management approach to maintain or improve resource conditions and visitor experience along the Park Road.

Figure 4 provides a visual depiction of transit and tour operations under this alternative.

MANAGEMENT ZONING

Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan* (see chapter 1). The current management zoning would continue, and could allow for an increase from the current condition in vehicle use west of Eielson to Wonder Lake.

DESCRIPTION OF THE TRANSPORTATION SYSTEM

Transit

Under this alternative, transit services would continue to originate at the Wilderness Access Center, and would continue to provide access to destinations along the length of the Park Road. Visitors would continue to be allowed to get off and reboard the bus at any point and ticket prices are prorated by bus destination. Some open seats, up to 35% of capacity, would continue to be retained to allow for spontaneous trip planning by walk-in visitors, and to pick up eastbound travelers.

Visitors would continue to obtain information by asking drivers questions (i.e., on-demand narration) or when a driver decides to provide information and commentary (i.e., driver-determined narration). Currently, the transit system is used by a high percentage of riders who choose to remain on the bus and not as a means of access for wilderness recreation. This reduces the number of seats available to pick up hikers along the Park Road.

Transit buses run on a regular schedule and the frequency of departures from the Wilderness Access Center would continue to be scheduled to meet demand.

Some transit buses are dedicated as "camper buses," which have less seating, but more room for recreation equipment (e.g., backpacks, camping gear, and bikes).

Under this alternative, transit users would continue to register for scheduled off-bus activities such as ranger-led Discovery Hikes.

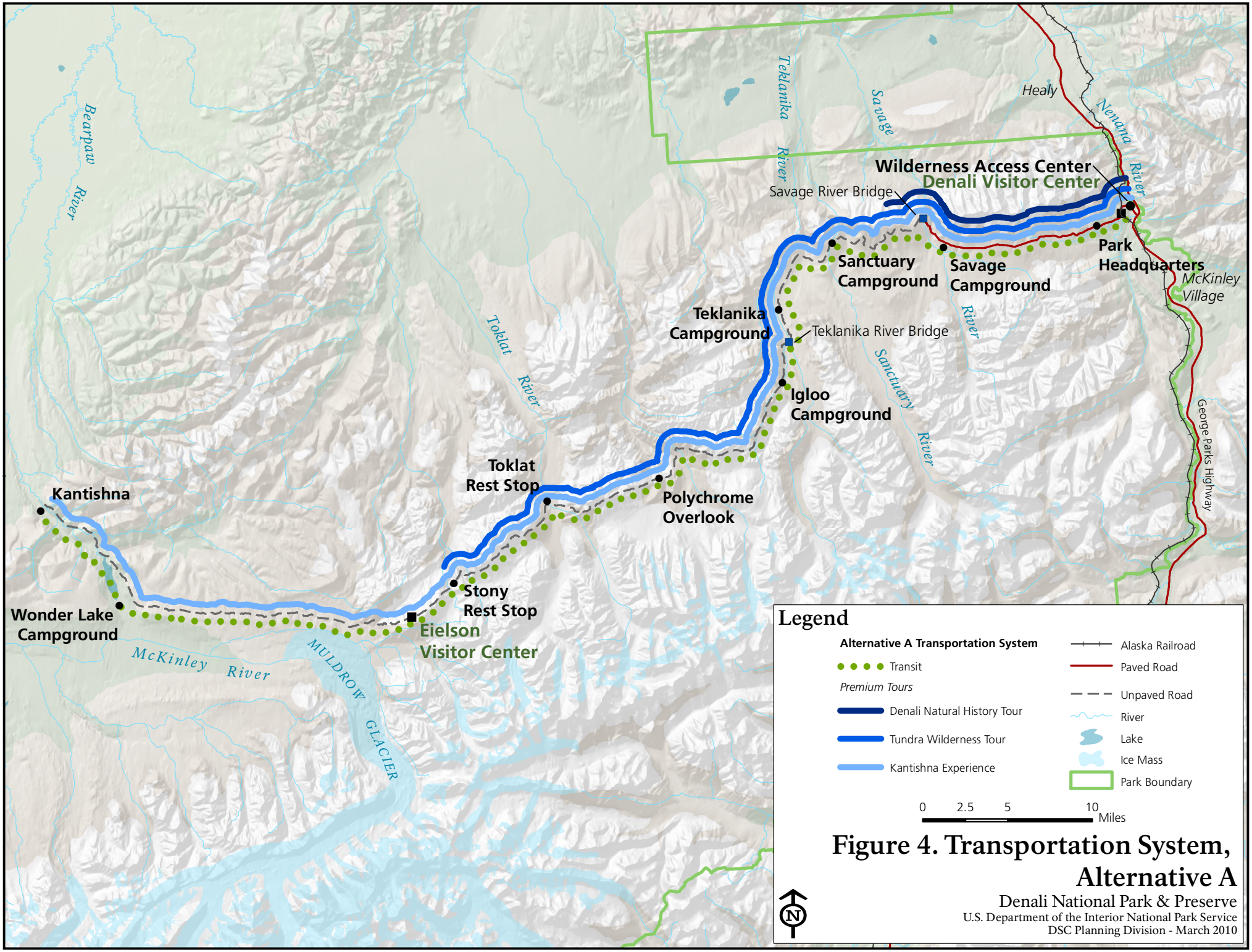


Figure 4. Transportation System, Alternative A

Denali National Park & Preserve

U.S. Department of the Interior National Park Service

DSC Planning Division - March 2010

Self-guided Economy Tour

There would continue to be no self-guided economy tour under this alternative.

Guided Premium Tours

Guided premium tours would continue to be offered to specific destinations along the Park Road. The Toklat Rest Stop at mile 53 receives the highest tour volume as the furthest rest area for the Tundra Wilderness Tour. When weather conditions are favorable, this tour would continue to Stony Overlook. Primrose at mile 17 receives a lower tour volume for the Denali Natural History Tour. Kantishna at mile 92 receives one Kantishna Experience per day.

In addition to a seasonal vehicle limit, daily limits would continue to be used to regulate the number of vehicles providing guided tours.

The Tundra Wilderness Tour is a full-day park experience. Bus drivers would continue to provide a narrated general park tour that is supplemented with enhanced viewing through media equipment. This tour would continue to pick up patrons at local hotels and includes a snack for attendees. Approximately 80% of these tours continue to Stony Overlook for mountain and wildlife views, based on driver judgment and weather, but they do not include a visit to a visitor center.

The Kantishna Experience is an interpretive program delivered by a driver and a ranger; it would continue to include two off-bus activities, as well as a stop at Eielson Visitor Center and a lunch.

The Denali Natural History Tour includes two off-bus interpretive programs and a snack. This tour would continue to travel the Park Road as far as Primrose at mile 17 before returning to the entrance area. Tour buses and other vehicles providing or supporting this tour are not counted against the seasonal vehicle limit.

Tours offer a pickup service at local hotels. They do not pick up eastbound hikers.

Bus Size

There would be no changes to the size of the buses traveling the Park Road under alternative A.

OTHER VEHICLE USE

National Park Service

Of the 10,512 vehicles allowed on the Park Road per season, 1,754 permits are allocated for daily NPS operations, which includes travel by emergency vehicles, road maintenance equipment, utility trucks, administrative travel, and employee access to west end duty stations. This limit has not changed since 1986 and would continue under this alternative.

Professional Photography and Commercial Filming

The professional photography program has a maximum of five road permits given out per day. These permits are distributed through a lottery system that has application criteria. Currently there are no limits to where professional photographers can be on the road; at any one time, it is possible for one or more photographers to be at roadside wildlife stops for longer time periods than other vehicle types.

The commercial filming program is managed through special use permits that are distributed at the discretion of park management.

Under this alternative, the professional photography and commercial filming programs would continue as described above.

Commercial Use for Kantishna Inholders

Kantishna inholder permits for vehicle use of the Park Road are based on the general management plan and other management documents. Four lodges in Kantishna offer overnight accommodations. Overnight guests are transported to the inholding by inholder-operated vehicles along the Park Road or via aircraft to the Kantishna airstrip. Two lodges also operate 12-hour-long commercial day tours to Kantishna and back to the park entrance. Other permitted vehicle use is by lodge employees, lodge support vehicles, and nonlodge inholders. Specific allocations for inholder vehicle use are set annually in the *Superintendent's Compendium*.

Teklanika River Campground

Visitors driving their private vehicles to Teklanika River Campground would be required to pay for a three-night minimum stay. Park Road travel with a valid Teklanika River Campground permit would continue to be limited to one round-trip to the campground. Further park travel would be through the transportation system.

Additional Vehicle Use

Researchers who need their vehicles for access, and meet management criteria may be permitted to drive their vehicles on the restricted section of the Park Road.

Contractor traffic needed for road repair or construction projects would continue to be permitted on the Park Road and is not counted against the 10,512 limit since the number of these vehicles fluctuates substantially from year to year and could potentially limit public access in some years. For example, over the last 10 years, contractor use has fluctuated from a low of approximately 150 vehicles to a high of 2,200 vehicles during the visitor season.

A small number of subsistence hunters would continue to use their private vehicles on the Park Road to access hunting in the Kantishna area.

COSTS

Operating costs (responsibility of the concessioner) and NPS costs are summarized in "Table 3: Summary of Alternative Elements." Operating costs were estimated through a financial feasibility analysis, which is on file at the park. A breakdown of NPS costs is provided in appendix B. All costs are presented in 2011 dollars and are not adjusted for inflation.

ACTIONS COMMON TO ALL ACTION ALTERNATIVES

- An important element common to the action alternatives B, C, and D is that vehicle use on the Park Road would be managed to achieve specific desired conditions. Through the use of indicators and standards (see table 5), the current visitor experience and resource condition would be maintained or improved. For the restricted section of the Park Road (Savage River to Wonder Lake), the following indicators would be used:
  - sheep gap spacing
  - nighttime traffic levels
  - large vehicle traffic
  - vehicles at a wildlife stop
  - vehicles in a viewscape
  - wait time for hikers
  - vehicles at rest areas and Eielson Visitor Center
- Additionally, comprehensive monitoring and data collection would take place for the following to detect any impacts attributable to changes made to the transportation system:
  - natural resource condition
  - visitor satisfaction
- All vehicles traveling on the restricted section of the Park Road would be required to follow a set pattern for vehicle movement to meet standards for achieving desired conditions.
- Within the transportation system, destinations for tour and transit service may change as long as resource protection and visitor experience standards are met. When allocating vehicle use within the transportation system, the transit service would have priority.
- As changes are made to the transportation system, visitors' perceived value of the transportation system will be assessed over time to guide decision making and ensure affordability of the system.
- A management toolbox (i.e., strategies for managing vehicle use to meet standards for desired conditions) would be used to manage vehicle use. From the least restrictive to most restrictive actions these strategies would include, but are not limited to:
  - adjust vehicle behavior (e.g., through education and contract and permit compliance)
  - adjust vehicle timing (e.g., change the schedule to allow for greater vehicle spacing)
  - adjust other vehicle use to favor the transportation system (e.g., Teklanika campers travel during low traffic volume and moving administrative traffic to nighttime hours)
  - reduce other vehicle use to favor the transportation system (e.g., NPS employees use transit system)
  - reduce vehicles in the transportation system
- Specialized tours, such as photography, geology, birding, and family friendly tours, would be provided by the concession contract, through regular park operations, and with park partners at the Murie Science and Learning Center.
- Opportunities for off-bus guided tour activities would be primarily restricted to the developed areas along the Park

Road or comply with the 2006 *Backcountry Management Plan*. Flexibility and freedom to move throughout the park would be addressed through changes in the transit system schedule and monitoring the indicator for hiker wait time.

- Key park themes and messages would be delivered to facilitate visitor understanding and appreciation for the park's natural and cultural resources. This would require all drivers and naturalists to meet minimum standards for interpretation, with Premium Tour bus drivers meeting the highest standard for interpretation.
- The range of transportation system options available to visitors would be clearly communicated through a variety of means (e.g., electronically, printed materials, and personal communication) by the Park Service and its partners.
- To improve visitor experience, efforts would be made to offer better wildlife and landscape viewing opportunities. The National Park Service would address the potential for using quieter, more comfortable buses through the concessions prospectus process.
- All tours would have at least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter.
- Educational programs provided directly by the National Park Service and Murie Science and Learning Center would have preference in available system capacity over commercial tours.
- ANILCA title XI, section 1110(b) provides that inholders shall be afforded adequate and feasible access to their property subject to reasonable regulations that may include timing of road use, vehicle behavior, and use of park facilities. The GMP allocation of 1,360 permits would remain in effect to provide inholders access on the restricted section of the Park Road for transporting overnight guests and for travel necessary for operation of the inholding. Park staff will work with inholders to address access to their inholding while striving to meet the goals of this plan.
- Conducting commercial activity in the park outside the boundary of the inholding is not provided by ANILCA section 1110(b). Visitor services, including commercial vehicle day tours on the Park Road, would be authorized consistent with park planning documents.
- Respecting ANILCA section 1110(b), the transit service would have priority when allocating vehicle use to ensure access for wilderness recreational opportunities, provide freedom of movement, and offer all visitors an affordable option for park access.
- All bus drivers, including inholder lodge drivers, would have the same minimum level of safety and interpretive training in order to drive on the Park Road and provide a consistent, high-quality visitor experience.

ALTERNATIVE B: OPTIMIZING ACCESS

GENERAL CONCEPT

This alternative promotes maximizing seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road. Visitors would have access to a highly structured transportation system that offers predictability, efficiency, and greater opportunity to have a park experience of choice, while meeting set standards for natural resource protection and visitor experience.

To fully optimize the transportation system, a majority of seats on both transit and tour buses would be filled by prebooking visitors (independent and organized groups). This would allow managers to predict daily vehicle needs and maximize the flexibility of the system to accommodate visitor demand.

The maximum annual and daily vehicle capacity for the Park Road would be published each year as part of the *Superintendent's Compendium*, subject to public notice and comment. This would allow the superintendent to set the next year's capacity based on monitoring, research, and lessons learned in the prior years' implementation.

Figure 5 provides a visual depiction of the nature of transit and tour operations under alternative B.

MANAGEMENT ZONING

Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan* (see chapter 1). The current management zoning could allow for an increase from the current condition in vehicle use west of Eielson to Wonder Lake.

DESCRIPTION OF THE TRANSPORTATION SYSTEM

Transit/Self-Guided Economy Tour Combination

This alternative would combine transit and self-guided economy tour services on the same bus to more efficiently use available seating. The major purpose in combining transit with a self-guided economy tour is to provide the greatest number of visitors an affordable option for accessing the park. Combining these two services on one bus could result in buses operating at or near capacity. Increasing the average number of visitors per bus could also result in an economy of scale that may result in lower operating and ticket costs. The majority of seats would be available for prebooking by all visitors, although some seats would be retained to allow for spontaneous trip planning for walk-in visitors, and to pick up eastbound travelers.

This combined service would be operated like a municipal bus system (e.g., runs on regular schedule) and marketed principally to individuals who want to design their own visit and who do not need or want personal on-bus interpretation. With an emphasis on providing park access, drivers would give safety messages, answer questions in a knowledgeable manner upon request, and provide a minimal level of orientation to facilitate wildlife viewing, although drivers would meet minimum standards for interpretation. Transit services would start at the Wilderness Access Center and provide access to the entire length of the Park Road. Ticket prices would be prorated by distance to destinations.

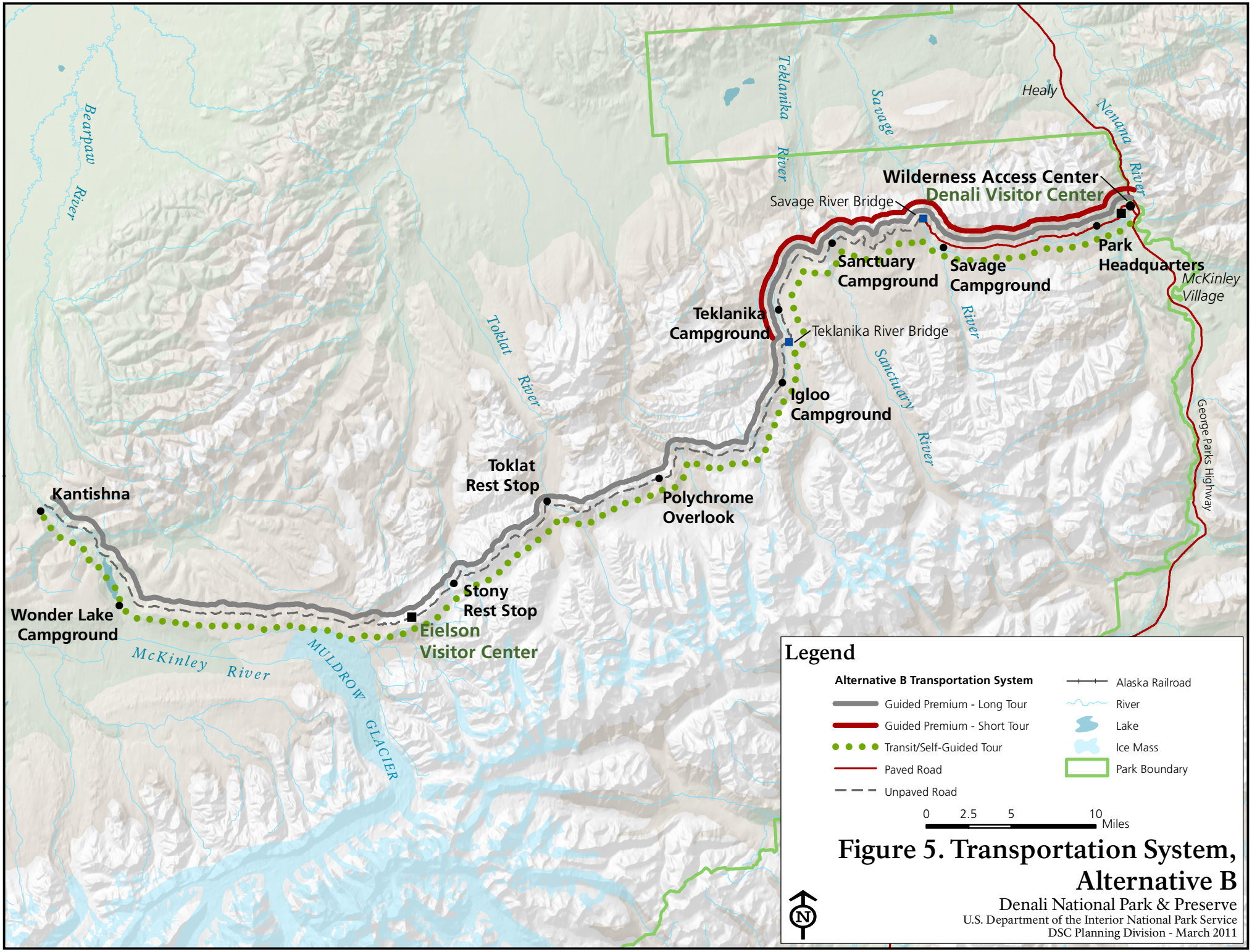


Figure 5. Transportation System, Alternative B

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There would not be dedicated camper buses under this alternative. Instead, strategies would be explored for carrying recreation equipment (e.g., backpacks, camping gear, and bikes) on the exterior of the buses.

Self-guided economy tours would use the transit bus system and visitors would start their tour at the Denali Visitor Center with a park orientation. Tour passengers would have the opportunity to retain a seat on the same bus throughout. The Park Service would also explore tools (e.g., reservation placards) to allow economy tour passengers the opportunity for more desirable seating.

Interpretive materials (guidebooks, lists of off-bus activities, activity packs for youth) would be included in the tour. Additional self-guided items may be included that would be used through a variety of tools (e.g., iPhones, iPods, and other audio devices). Visitors could also register for scheduled off-bus activities such as Discovery Hikes. Food and beverages would not be included.

The self-guided economy tour ticket price could be higher than a transit ticket to reflect a park orientation and inclusion of interpretive items.

This alternative may require regularly reallocating buses between transit and premium tour services. It may also require reallocating use between the transportation system vehicles and other vehicles of the Park Road.

Guided Premium Tours

The major purpose of premium tours in this alternative is to provide visitors with an experience that offers guided interpretation, education, and visitor opportunities to understand and appreciate the park's natural and cultural resources. Premium tours could include off-bus activities with professional interpretive programs, guided talks at key locations, and the use of media and technology. Premium tours would be offered along the length of the Park Road, with a higher volume of these tours occurring between Savage River and Teklanika. Food and beverages would be included.

Premium tour seats would be available for 100% prebooking for all visitors. This predictability in visitor demand would allow for optimization of bus scheduling and use.

Returning eastbound, and if seats are available, hikers could be picked up on tour buses for transport to the entrance area.

- Premium Short Tour: Up to half a day in duration, these tours would be offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika). Topics and activities for the short tour would be standardized (i.e., wildlife, park history, and wilderness) to increase operating efficiencies in training and marketing. Premium short tours would incorporate a visit to the Denali Visitor Center and would originate from the Wilderness Access Center or with a pickup at a local hotel.
- Premium Long Tour: These tours would be offered to destinations the length of the Park Road, but would predominately operate within Wildlife Viewing Subzone 2 (Teklanika to Wonder Lake). Long tours would be developed for visitors who want a guided experience and have a full day to enjoy the park. A variety of tour topics and activities would be offered and tour destinations would be driven by visitor demand. Visitors could expect that long tours would provide more opportunities than the short tour to view wildlife and scenery due to time and distance traveled.

Premium long tours would start at the Wilderness Access Center or with a pickup at a local hotel. Tour passengers would have an opportunity to visit the Denali Visitor Center, the Toklat Rest Stop, or Eielson Visitor Center as part of their guided tour package.

Bus Size

To fully optimize the transportation system, the Park Service may conduct a study to explore the effects of buses larger than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika). A structural upgrade to the road would not be needed to accommodate these larger vehicles. If the study results in no adverse effects, and set standards for natural and cultural resources and visitor experience are maintained, larger buses could be used.

Also, because the longer premium tours would reach areas west of Teklanika where there is a substantial change to the road structure, bus size would not exceed the current design standard for Wildlife Viewing Subzone 2.

OTHER VEHICLE USE

To maximize the number of visitors who can have a park experience, other vehicle use may be reallocated to benefit the transportation system. The following management strategies represent the most restrictive actions that could be taken over the life of the plan.

National Park Service

NPS employees would access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) via an employee shuttle system. The transit system would be used by employee guests for access. Contractors and NPS operations would be managed (i.e., scheduling and volume of vehicle use) to minimize displacement of visitors and prevent resource impacts.

Professional Photography and Commercial Filming

The professional photography and commercial filming programs would be combined to provide greater equity in permit distribution and gain efficiencies in administration and oversight. Two private vehicle permits would be allowed each day and managed for two distinct areas: Savage River to Toklat and Toklat to Wonder Lake. During periods of high traffic volume (i.e., defined as days or periods of days when nonsystem use would displace buses), permit holders may be required to use the transit system to avoid displacement of visitor opportunities and administrative functions.

Commercial Use for Kantishna Inholders

Commercial authorizations would be issued to retain current levels of day tour service to each Kantishna lodge (not to exceed four per day total for all lodges combined).

Teklanika River Campground

Private vehicles used to access Teklanika River Campground would travel westbound on the Park Road during a designated time period to minimize displacement of visitors and prevent resource impacts. If needed (to accommodate growth or minimize decreases in buses that may result from violations of the indicators and standards), Teklanika River Campground would phase in a tents-only campground over a 10-year period with visitors using the transportation system for access.

COSTS

Operating costs (responsibility of the concessioner) and NPS costs are summarized in "Table 3: Summary of Alternative Elements." Operating costs were estimated through a financial feasibility analysis, which is on file at the park. A breakdown of NPS costs is provided in appendix B. All costs are presented in 2011 dollars and are not adjusted for inflation.

ALTERNATIVE C: MAXIMIZING VISITOR OPPORTUNITIES

GENERAL CONCEPT

This alternative promotes a variety of visitor opportunities that range from brief experiences in the park's entrance area, to short and long visits along segments of the Park Road, to multiday experiences in the park's backcountry. Visitors would have opportunities for spontaneity and freedom during their park visit, while set standards for resource condition and visitor experience are met.

The transportation system in this alternative would separate tour and transit functions by developing a self-guided economy tour. Distinguishing the economy tour experience from transit offers benefits to both user groups. Dedicated transit services would provide more seating for eastbound hikers, increasing visitors' freedom of movement. A dedicated economy tour service would provide visitors with a modest tour experience.

To further preserve wilderness resource values and contemplative visitor experiences, a new management subzone on the Park Road would be created west of Eielson Visitor Center to Wonder Lake (Wildlife Viewing Subzone 3). This section would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition (see figure 4).

The maximum annual and daily vehicle capacity for the Park Road would be published each year as part of the *Superintendent's Compendium*, subject to public notice and comment. This would allow the superintendent to set the next year's capacity based on monitoring, research, and lessons learned in the prior years' implementation.

Figure 6 provides a visual depiction of the nature of transit and tour operations under alternative C.

MANAGEMENT ZONING

The following changes to the Park Road subzones would be implemented to clarify management objectives necessary to achieve desired conditions within specific road sections (see figure 7). These changes are made in part to reaffirm the 2007 *Road Design Standards* and further support the preservation of character-defining qualities and attributes contributing to the road's eligibility for the national register. The proposed changes include the following:

1. The creation of Wildlife Viewing Subzone 3 (from the Eielson Visitor Center to the Wonder Lake junction).

   This subzone includes the gravel section of Park Road that is maintained to a narrower width on which greater vehicle restrictions (Rules of the Road) continue to apply. Visitors must use one of the bus systems; private vehicles are restricted. Buses are given the right-of-way. The primary purpose of this road segment is for a more wild and remote type of visitor experience along the road corridor to view wildlife and scenery. Travel to this section of the road requires a significant time commitment by visitors. Those who make the trip would experience a more quiet and contemplative setting and fewer encounters with other vehicles along this section of road than in Wildlife Viewing Subzone 2. Park facilities are highly limited to minimize any additional footprint on the landscape and no visitor contact stations would be provided along this section of road.

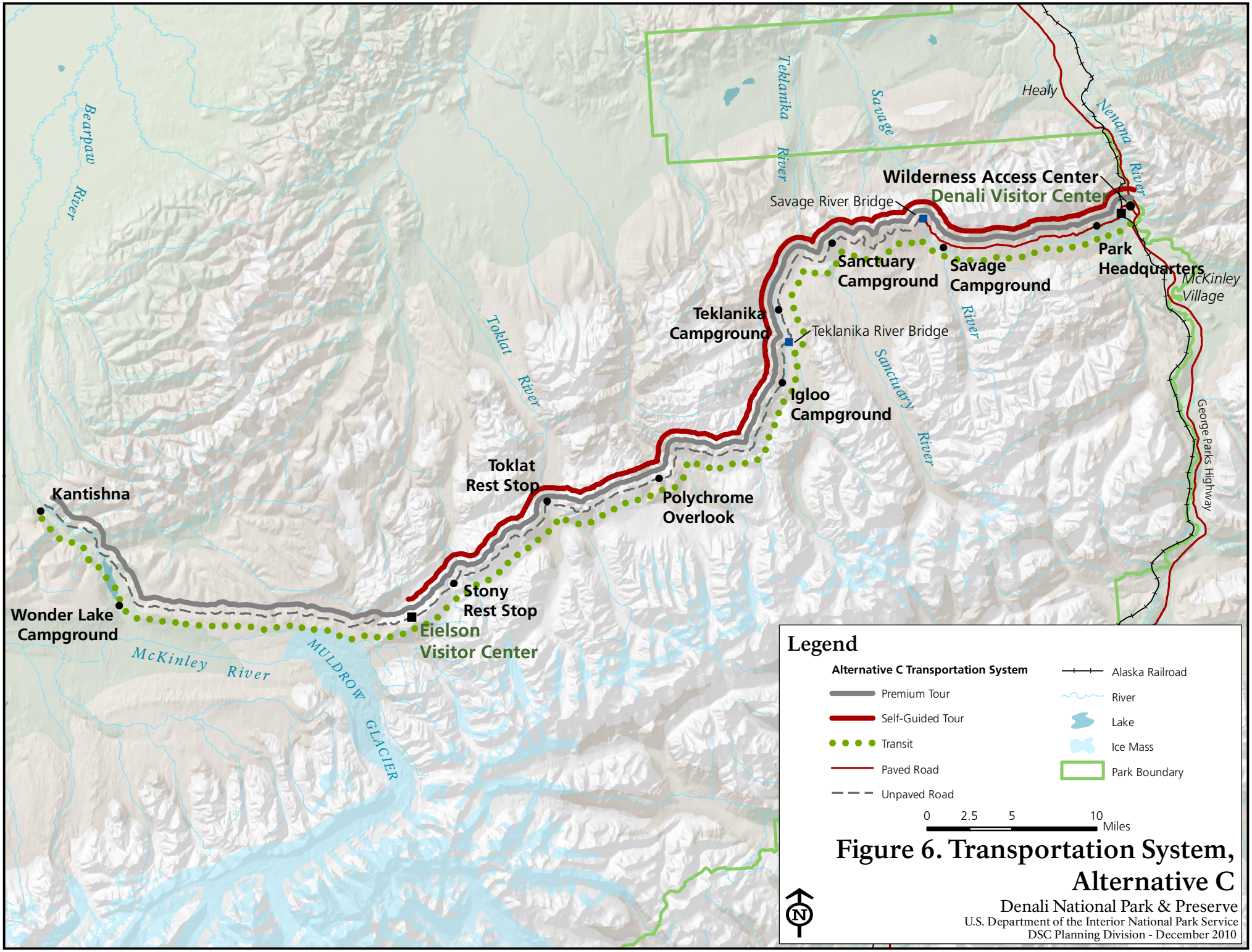


Figure 6. Transportation System, Alternative C

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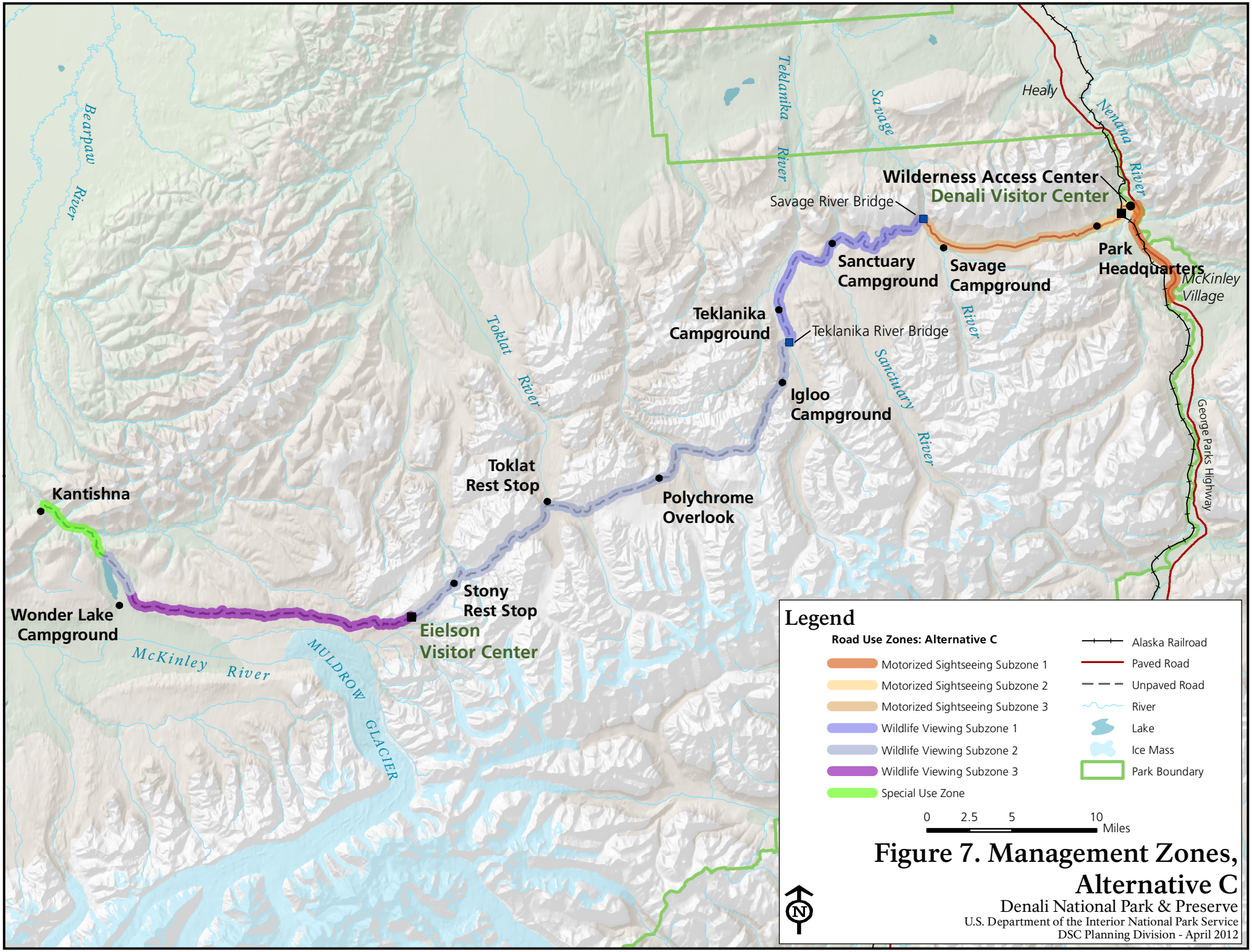


Figure 7. Management Zones, Alternative C

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U.S. Department of the Interior National Park Service

DSC Planning Division - April 2012

2. The areas included in Wildlife Viewing Subzone 2 would continue for the Park Road from the Teklanika River Bridge to the Eielson Visitor Center and from the Wonder Lake junction to the Old Park Boundary.

DESCRIPTION OF THE TRANSPORTATION SYSTEM

Transit

The major purpose of transit in this alternative is to facilitate a full range of off-bus experiences (e.g., visiting a visitor center, hiking in the backcountry, participating in a NPS educational program, accessing campgrounds, and taking photographs of wildlife and scenery). The service would be marketed to promote these off-bus opportunities, although visitors would not be required to get off the transit bus.

Transit would begin at the Wilderness Access Center and access the full length of the Park Road. Buses would turn around at various destinations, which may require a change of buses for transit riders traveling farther into the park. For example, the park might consider a loop shuttle between Eielson and Kantishna, such that direct transit service would go only as far as Eielson and visitors would use the loop shuttle to go further west. Visitors would be able to get off and reboard the bus at any point and ticket prices would be prorated by distance to the bus destination.

All visitors (both independent travelers and organized groups) would have the opportunity to prebook a majority of transit seats; however, some seats would be retained to allow for spontaneous trip planning for walk-in visitors. Additionally, the transit system would be managed for freedom of movement by keeping some seats on each bus available to pick up eastbound hikers.

Transit would also provide transport to the Wilderness Access Center for tour passengers who choose to leave their tour and have an unstructured park experience. This emphasis on increased flexibility by managing transit for lower bus rider occupancy could result in a higher cost compared to the existing condition.

Interpretation would be offered on transit through nonpersonal services (e.g., printed materials). Drivers would answer questions in a knowledgeable manner upon request.

Transit buses would run on a regular schedule to provide a high level of predictability and reliability for wilderness recreation. Frequency of departures from the Wilderness Access Center would be scheduled to meet demand. The Denali Visitor Center would be a regular drop-off point on the transit schedule for eastbound buses on the way back to the Wilderness Access Center. Those who take advantage of the Denali Visitor Center would use an entrance area shuttle to return to the Wilderness Access Center.

Self-guided Economy Tour

The major purpose of the self-guided economy tour is to facilitate an independent, affordable, on-bus Park Road experience. Self-guided economy tours would be provided via a dedicated bus system and would reach various destinations along the Park Road. Passengers would retain a seat on the same bus throughout the tour.

Self-guided tour materials (e.g., guidebooks, list of options for off-bus activities, and use of activity packs for youth) could be included in the ticket price.

Passengers could obtain supplemental interpretive materials that would be used through a variety of means (e.g., MP3 players, smartphone technology, or other audio devices). Site-specific information from the driver would augment self-guided tour materials. No food or beverage services would be provided. Self-guided economy tours

would originate at both the Wilderness Access Center and Denali Visitor Center, but not outside of the park. If space is available, eastbound tour buses could pick up hikers.

Guided Premium Tours

Premium guided tours would be developed to provide a fully facilitated park experience conducted by the Park Service, concessioners, or education partners.

A variety of premium tour options of different lengths and topics would be provided to meet the needs of diverse audiences. Tours to major destinations along the Park Road could provide either a general park overview or focus on a particular theme that explores various park resources in depth (e.g., birding and wolves). Tour size would be tailored to the needs and constraints of the tour program. Size and configuration of bus equipment would be directed by the type of tour, but would not exceed the current design standard.

All premium tour passengers would have at least one opportunity for a visit at an NPS interpretive facility or interact with an NPS interpreter.

Passengers would receive a fully narrated tour by a driver and/or naturalist providing the highest standard of interpretation, which may be supplemented by media and technology. All drivers and naturalists would be trained to NPS standards. Additional learning opportunities could be provided en route through off-bus experiences (e.g., guided walks and demonstrations). Food and beverages could be included.

Premium tours could be 100% prebooked. Visitors without reservations would stand by for seats. Premium tours could pick up passengers at the Wilderness Access Center or at local hotels. Premium tour buses would not pick up hikers along the Park Road.

In alternative C, attempts would be made to increase comfort on tour buses by reducing the number of seats on these buses. In addition, better viewing opportunities would be provided on tours, and the technology and interpretive materials would be updated more frequently.

Bus Size

The size and configuration of premium tour bus equipment would be directed by the type of tour, but would not exceed the current design standard.

OTHER VEHICLE USE

To increase visitor opportunities, vehicle use may be reallocated to benefit the transportation system. The following management strategies represent the most restrictive actions that would be taken over the life of the plan.

National Park Service

NPS employees could use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) during periods of low traffic volume (i.e., outside of those days or periods of days when nonsystem use would displace buses). During periods of high traffic volume, employees would use the transit system.

Employee guests could travel with employees or use the transit or economy tour system for access.

Contractors and NPS operations would be managed (i.e., scheduling and volume of vehicle use) to minimize displacement of visitors and prevent resource impacts.

Professional Photography and Commercial Filming

The professional photography and commercial filming programs would be combined to provide greater equity in permit distribution and to gain efficiencies in administration and oversight. Up to three permits per day would be available for the entire road, during the shoulder seasons that occur from Memorial Day weekend to approximately June 10, and approximately August 25 to the end of the season. During the peak season (approximately June 10 to August 25), up to one permit per day would be issued for the entire Park Road. At no time may two or more professional photographer/ commercial filming vehicles be stopped at the same location if standards would be exceeded.

During periods of high traffic volume, permit holders would be required to use the transit system to avoid displacement of visitor opportunities and administrative functions

Commercial Use for Kantishna Inholders

One or more commercial authorizations would be issued for commercial day tours to Kantishna.

Teklanika River Campground

Private vehicles used to access Teklanika River Campground would travel on the Park Road only during designated periods of low traffic volume to minimize displacement of visitors and prevent resource impacts.

COSTS

Operating costs (responsibility of the concessioner) and NPS costs are summarized in "Table 3: Summary of Alternative Elements." Operating costs were estimated through a financial feasibility analysis, which is on file at the park. A breakdown of NPS costs is provided in appendix B. All costs are presented in 2011 dollars and are not adjusted for inflation.

ALTERNATIVE D: NPS PREFERRED ALTERNATIVE

GENERAL CONCEPT

This alternative would offer visitors the opportunity to have a high-quality experience using a transportation system that offers predictability, efficiency, and a variety of experiences.

The number of vehicles, their schedules, and behavior would be managed to meet visitor demand while maintaining standards for desired resource and visitor experience conditions. Several times each season, key indicators would be monitored to assess the success of current traffic levels and traffic patterns to operate within set standards.

Comprehensive monitoring would also be conducted at regular intervals to specifically address the impacts of traffic on wildlife, wilderness, and the visitor experience. A Before-After Control Impact (BACI) study design would be conducted within the first five years of the plan's implementation to affirm the selection of key indicators and to distinguish impacts due to changes in current traffic patterns and traffic levels. Data from some long-term inventory and monitoring programs may also be used to evaluate whether changes in the resource condition are occurring.

In addition to managing for desired conditions, the maximum level of vehicle use on the restricted section of the Park Road would be 160 vehicles per 24-hour period. This limit includes all motor vehicles counted westbound at the Savage River Check Station. The 160-vehicle limit is derived from traffic model simulation results and extensive scientific research on visitor preferences and resource condition.

The Park Service would modify current park-specific CFR regulations to set the maximum level of daily vehicle use at 160 vehicles per 24-hour period during the GMP-defined visitor season. Additional research and NEPA compliance (including public review) would be required to increase the maximum level of vehicles set in this plan, or to modify the standards.

Figure 8 provides a visual depiction of the nature of transit and tour operations under alternative D.

MANAGEMENT ZONING

The following proposed changes to the Park Road subzones would be implemented to clarify management objectives necessary to achieve desired conditions within specific road sections (see figure 9). These changes are made in part to reaffirm the *2007 Road Design Standards* and further support the preservation of character-defining qualities and attributes contributing to the road's eligibility for the national register. The proposed changes include the following:

1. Wildlife Viewing Subzone 3 (from the Eielson Visitor Center to the Wonder Lake junction) would be created.

   This subzone includes the gravel section of the Park Road that is maintained to a narrower width on which vehicle restrictions (Rules of the Road) continue to apply. Visitors must use one of the bus systems; private vehicles are restricted. Buses are given the right-of-way. The primary purpose of this road segment is for a more wild and remote type of visitor experience along the road.

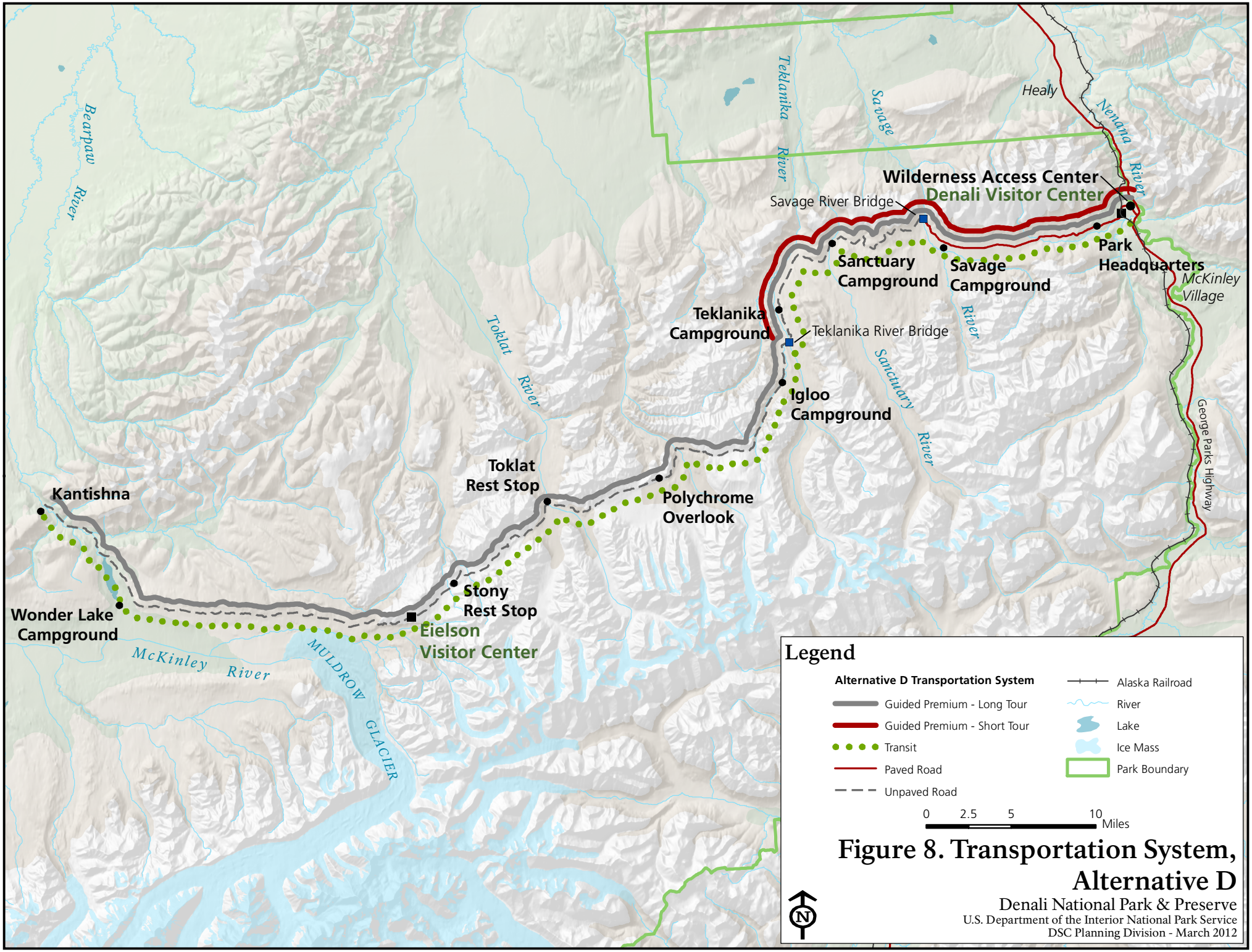


Figure 8. Transportation System, Alternative D

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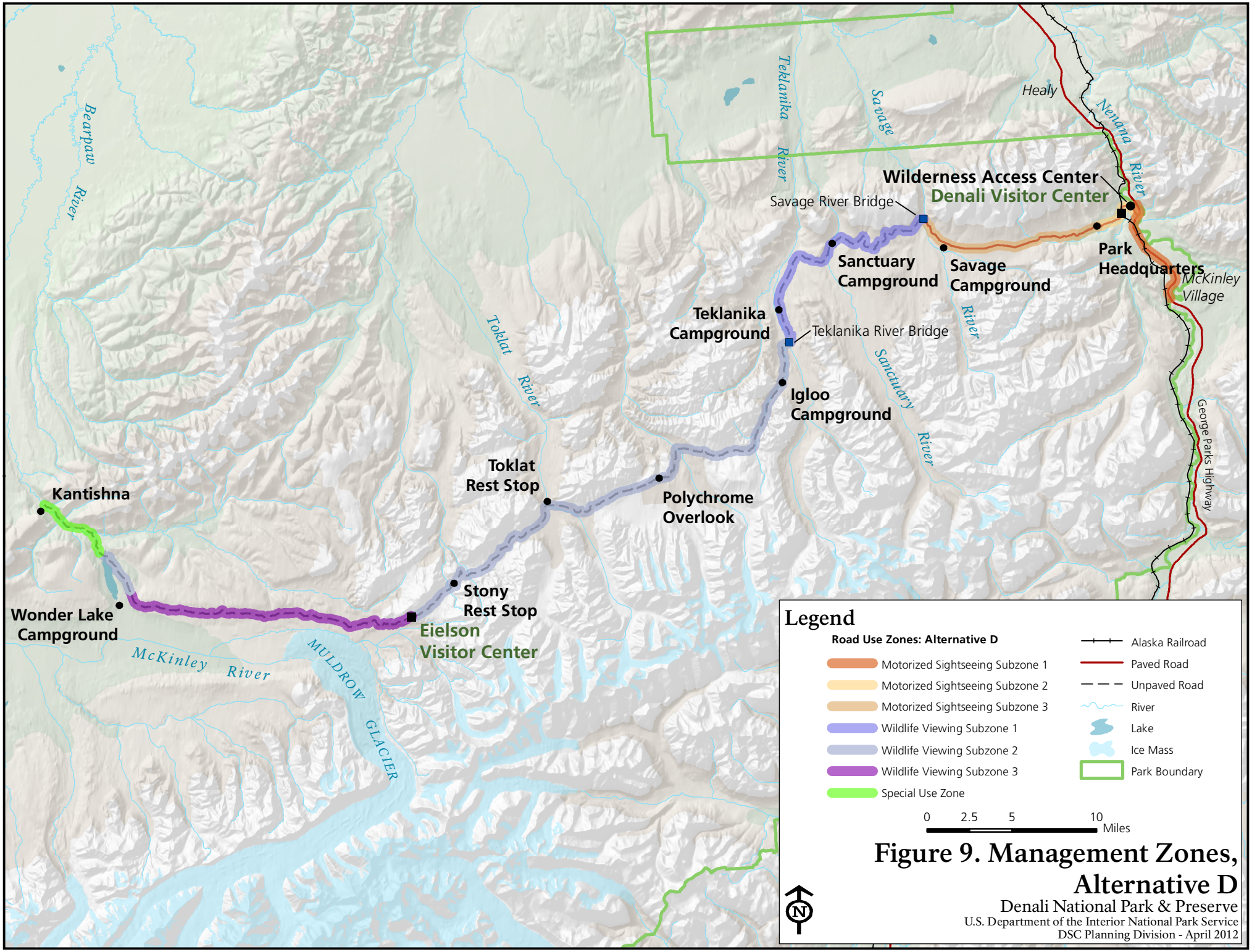


Figure 9. Management Zones, Alternative D

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Travel to this section of the road requires a significant time commitment by visitors. Those who make the trip would experience a more quiet and contemplative setting and fewer encounters with other vehicles along this section of road than in Wildlife Viewing Subzone 2. Park facilities are highly limited in this zone to minimize any additional footprint on the landscape. No visitor contact stations would be provided along this section of road.

2. Wildlife Viewing Subzone 2 would continue. This zone would extend from the Teklanika River Bridge to the Eielson Visitor Center and from the Wonder Lake junction to the Old Park Boundary.

3. Wildlife Viewing Subzone 1 would remain the same.

DESCRIPTION OF THE TRANSPORTATION SYSTEM

Transit

The transit service would provide access along the entire length of the Park Road. Visitors could get off and reboard at any point along the way. Transit buses would be operated to meet the needs of hikers, campers, and visitors who may choose to remain on board. The majority of seats would be available for prebooking, and ticket pricing would be determined by destination. Some open seats would be retained in the reservation system to allow for spontaneous trip planning. Departing buses would have some open seating to facilitate visitor pickup along the Park Road.

Transit buses would run on regular intervals from the Wilderness Access Center and be scheduled to meet visitor demand. Transit buses would be equipped with external bike racks to better accommodate cyclists and to optimize seating. In addition, all transit buses would be configured to accommodate recreation and camping equipment, which may be carried externally. The Denali Visitor Center would be a regular stop on the eastbound transit schedule during operating hours to give visitors the option of disembarking. Transit buses would not dwell at the Denali Visitor Center.

Transit drivers would provide key park messages, relevant information, and answers to visitor questions. Self-guided tour materials would be available for purchase to supplement the visitor experience, but a discrete self-guided tour would not be offered. Visitors could also use transit for accessing off-bus activities such as Discovery Hikes.

Guided Premium Tours

Premium tours would provide visitors with guided interpretation and education, providing enhanced opportunities to understand and appreciate the park's natural and cultural resources. Off-bus activities with professional interpretive programs, guided talks at key locations, and the use of media and technology could be included on premium tours. Premium tours would be offered along the length of the Park Road, with a higher volume of these tours occurring between the Savage and Teklanika rivers. Premium tours would have at least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter.

Premium tours may include food and beverages.

Premium tour seats would be available for prebooking for all visitors. This practice would allow for efficient bus scheduling and use. A small percentage of seats would be held for walk-in visitors.

Guided Premium Tours would include:

Premium Short Tour: Up to half a day in duration, these tours could be offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika). Thematic narration and appropriate activities for the short tour could include on- and off-bus activities (i.e., wildlife, park history, wilderness, walks, and educational programs).

Premium Long Tour: These tours would be offered to destinations along the full length of the Park Road, but predominately operate within Wildlife Viewing Subzone 2 (Teklanika to Eielson Visitor Center). Long tours would be developed for visitors who want a guided experience and have a full day to enjoy the park. Thematic narration and appropriate activities would be offered and tour destinations would be driven by visitor demand. Visitors could expect that long tours would provide more opportunities than the short tour to view wildlife and scenery due to time and distance traveled. Premium long tours would start at the Wilderness Access Center or with a pickup at a local hotel.

In addition to guided premium tours, specialized educational programs on a variety of topics would be conducted in cooperation with, or through the Murie Science and Learning Center.

Bus Size

The Park Service may conduct a study to explore the effects of buses larger than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika). A structural upgrade to the road would not be needed to accommodate these larger vehicles. If the study results in no adverse effects, and set standards for natural and cultural resources and visitor experience are maintained, larger buses could be used east of Teklanika.

OTHER VEHICLE USE

To maximize the number of visitors who can have a park experience, other vehicle use may be reallocated to benefit the transportation system. The following management strategies represent the most restrictive actions that could be taken over the life of the plan.

National Park Service

Contractor and NPS operations would be managed to minimize impacts on visitors and prevent resource impacts.

During periods of low traffic volume, NPS employees could use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake). During periods of high traffic volume, employees would use an employee transportation system (i.e., carpool or employee shuttle).

Guests of employees could travel with employees or use the transportation system for access.

Professional Photography and Commercial Filming

The professional photography and commercial filming programs would be combined to provide equity in permit distribution and gain efficiencies in administration and oversight. Up to five permits per day would be available for the entire road, as long as photographer vehicles do not displace buses or administrative traffic. Permits would be reduced as necessary to avoid displacement of visitor opportunities and administrative functions.

Permits would include stipulations necessary to ensure standards for desired conditions are met (e.g., no more than one photographer vehicle at a wildlife stop, no parking in sheep

crossing zones, and consideration of vehicles in the viewshed on the Park Road).

Commercial Use for Kantishna Inholders

Concession contracts would be issued to offer commercial day tours to Kantishna.

Teklanika River Campground

If needed to meet standards, private vehicles driving to and from Teklanika River Campground would travel on the Park Road during periods of low traffic volume.

COSTS

Operating costs (responsibility of the concessioner) and NPS costs are summarized in "Table 3: Summary of Alternative Elements." Operating costs were estimated through a financial feasibility analysis, which is on file at the park. A breakdown of NPS costs is provided in appendix B. All costs are presented in 2011 dollars and are not adjusted for inflation.

IDENTIFICATION OF THE NPS PREFERRED ALTERNATIVE

In response to public comment, the preferred alternative includes a maximum level of vehicle use for the restricted section of the Park Road that would be set in regulation at 160 vehicles per 24-hour period. This limit includes all motor vehicles counted westbound at the Savage River Check Station. The 160-vehicle limit is derived from traffic model simulation results used for analysis in the DEIS and extensive scientific research on visitor preferences and resource condition.

In general, the scope of alternative D (the preferred alternative) is a combination of elements from alternative B regarding the optimization of the transportation system, and management strategies described in alternative C for other vehicle use on the Park Road.

Elements of Alternative A were also incorporated into the preferred alternative to reflect a transit system that accommodates hikers, campers, and visitors who might choose to stay on board. Based on many comments, a self-guided economy tour was not incorporated as a discrete tour product or in combination with the transit service. However, self-guided tour materials would be available for all visitors.

The premium tour service in the preferred alternative is similar to alternative B with the exception of highlighting the role of the Murie Science and Learning Center in offering specialized educational tours.

There was strong public support for the creation of Wildlife Viewing Subzone 3, which was carried over from alternative C.

The option to study a larger bus design in Wildlife Viewing Subzone 1 that had been described in alternative B, was also incorporated.

Public comment did shape the elements of other vehicle use in the preferred alternative. The Park Service and its contractors would manage their own vehicle use to minimize impacts on visitors and prevent resource impacts. This might include the use of an employee transportation system (i.e., carpooling or shuttle system) rather than use of personal vehicles for travel to and from duty stations west of the Savage River Check Station.

The professional photography and commercial filming programs would be combined as proposed in alternatives B and C. However, the number of permits available for the combined program would be up to five per day and dependent on known traffic volume. This addresses a comment asking for more permits in the desirable shoulder seasons and the reduced need for permits during the peak visitor season.

Commercial day tours to Kantishna would be managed under concession contract. Visitors would continue to be able to drive their private vehicles to the Teklanika River Campground, but may have to travel during periods of low traffic volume.

THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The Park Service is required to identify the environmentally preferable alternative(s) in its NEPA documents for public review and comment. Guidance from the Council on Environmental Quality states that the environmentally preferable alternative(s) is the alternative that "causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural and natural resources" (CEQ 1981).

As described in chapter 1, all of the alternatives would have minimal impact on biological or physical resources such as vegetation, soundscape, air quality, water resources, geology, and soils. However, all alternatives would continue to cause impacts on wildlife because of the presence of vehicles and people along the Park Road. These could include effects on wildlife behavior, habituation, movement, or stress levels.

Under alternatives B, C, and D, use of the Park Road could increase should the demand exist, which could both benefit and adversely affect wildlife. For example, the transportation model for these alternatives indicates there could be a reduction in bus volumes on the road during the peak daytime hours (benefit), but there could be an increase in volume through what are currently shoulder periods of the day (early- to mid-morning and late afternoon through evening). Therefore, this effect would extend the overall daily duration of wildlife disturbance and reduce the amount of "downtime" for wildlife to be free from bus/human disturbances (an adverse impact).

However, all three action alternatives would provide environmental benefits compared to alternative A through the implementation of monitoring and adaptive strategies for managing vehicle use and protecting wildlife, wilderness values, and other park resources.

Unlike alternative A, alternatives B, C, and D would incorporate a formal program of indicators, standards, and adaptive management strategies for the protection and preservation of desired conditions for natural resources. For example, under all of these action alternatives, sheep gap spacing would be monitored to minimize impacts on Dall sheep, nighttime traffic would be monitored to minimize disturbances to wildlife, and studies would be used to monitor and assess natural resource conditions. Based on the results of the monitoring, management actions could then be taken to ensure that standards are met. This formal program would provide better long-term protection and preservation of natural resources when compared to alternative A.

Alternatives C and D include a new management zone—Wildlife Viewing Subzone 3 from the Eielson Visitor Center to the Wonder Lake junction. The intent of this zone is to further preserve wilderness resource values and contemplative visitor experiences. This zone would be managed for the lowest traffic volume on the Park Road and notable growth in traffic beyond the current condition would not be allowed. Establishing this management zone could have the indirect effect of minimizing disturbances to wildlife in this area over the length of this plan.

As described in chapter 1, none of the alternatives would have more than negligible effects on cultural resources, as there would be no ground disturbance, construction activities, or any other alterations that would affect archeological sites, historic structures, or cultural landscapes. None of the alternatives would impede access to places of traditional religious, ceremonial, or other customary activities, nor would any of the alternatives affect how museum collections are managed. As a result, all alternatives provide the same level of protection and

preservation of historic and other cultural resources.

Considering the potential for alternatives B, C, and D to better protect and preserve natural resources, they were considered to be less damaging to park resources than alternative A. However, because alternatives B, C, and D are similar in terms of impacts on wildlife and other natural resources, the Park Service has determined that all three action alternatives are environmentally preferable compared to alternative A.

SUMMARY TABLES

As required by the National Environmental Policy Act, the alternatives described in this chapter represent a full spectrum of options for managing vehicles along the Park Road at Denali. Table 3 provides a summary of actions proposed under each alternative, while table 4 provides a summary of the environmental consequences associated with each alternative.

Table 3. Summary of Alternative Elements

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
General Concept	This concept reflects current conditions at Denali, and provides a baseline against which to compare the other management concepts. Currently, vehicle use on the restricted section of the Park Road is managed to maintain a 10,512 seasonal limit that was set in the 1986 general management plan and then formalized in regulations in 2000.	This concept promotes maximizing seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road. Visitors would have access to a highly structured transportation system that offers predictability, efficiency, and greater opportunity to have a park experience of choice, while meeting set standards for natural resource protection and visitor experience.	This concept promotes a variety of visitor opportunities that range from brief experiences in the park's entrance area, to short and long visits along segments of the Park Road, to multiday experiences in the park's backcountry. Visitors would have opportunities for spontaneity and freedom during their park visit, while set standards for resource condition and visitor experience are met.	This concept promotes optimal use of all transit and tour vehicles offering the largest number of visitors the opportunity to have a quality experience on the Park Road. Visitors would have access to a transportation system that offers predictability, efficiency, and the opportunity to have a park experience of choice. Vehicle numbers, schedules, and behavior would be managed to maintain standards for desired resource and visitor experience conditions. In addition to using indicators and standards for vehicle management, the number of vehicles allowed on the restricted section of the Park Road during the GMP-defined visitor season (late May through mid-September) would not exceed a maximum level as defined below: • 160 vehicles per 24-hour period traveling westbound at the Savage River Check Station • All motor vehicles are included

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
General Concept (continued)				To meet standards, the number of vehicles allowed could be less than this maximum. Additional research and compliance would be required to increase the maximum level set in this plan, or to modify the standards.
Management Zoning	Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan.* Current management zoning could allow for an increase from the current condition in vehicle use west of Eielson to Wonder Lake.	Same as alternative A.	A Wildlife Viewing Subzone 3 would be created west of Eielson Visitor Center to Wonder Lake; it would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition.	A Wildlife Viewing Subzone 3 would be created west of Eielson Visitor Center to the Wonder Lake campground junction; it would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the condition under the current management program.
Transportation System				
Transit	Would provide access along the Park Road where visitors could get off and reboard at any point. Ticket price would be determined by destination. Could be used by a high percentage of riders who choose to remain on the bus, which reduces the number of seats available to pick up hikers along the Park Road.	Transit and self-guided economy tour services would be combined on the same bus to provide the greatest number of visitors an affordable option to access the park. Transit riders could get off and reboard at any point, but tour passengers would have the opportunity to retain a seat on the same bus throughout. The Park Service would explore tools (e.g., reservation placards) to allow economy tour passengers	The purpose would be to facilitate a full range of off-bus experiences. Riders could get off and reboard at any point, and ticket prices would be prorated by distance to the bus destination. Would run on a regular schedule from the Wilderness Access Center and scheduled to meet demand. Buses would turn around at various destinations, which	Buses would provide access along the Park Road where visitors could get off and reboard at any point, or remain on board. Ticket price would be determined by bus destination. Buses would originate from the Wilderness Access Center and operate on a regular schedule, managed to meet visitor demand and standards.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Transit (continued)	Would run on a regular schedule from the Wilderness Access Center and scheduled to meet demand. Some open seats would be retained to allow for spontaneous trip planning for walk-in visitors and to pick up eastbound travelers. Some buses would be dedicated as "camper buses" and have less seating, but more room for recreation equipment. Interpretation would be on-demand and driver determined. Visitors could register for scheduled off-bus activities such as Discovery Hikes.	the opportunity for more desirable seating. Ticket prices would be prorated by distance to destinations (tour prices would likely be higher than transit). Would be operated like a municipal bus system (e.g., runs on a regular schedule). Transit riders depart from the Wilderness Access Center; tour riders depart from the Denali Visitor Center after park orientation. Some open seats would be retained to allow for spontaneous trip planning for walk-in visitors and to pick up eastbound travelers. Strategies would be explored for carrying recreation equipment on the bus exterior. Interpretation would be on-demand and driver determined, with interpretive materials included for tour passengers. Visitors could register for scheduled off-bus activities such as Discovery Hikes.	might require a change of buses for traveling farther into the park. The Denali Visitor Center would be a regular stop on the transit schedule for eastbound travelers. Some seats would be retained to allow for spontaneous trip planning for walk-in visitors and to pick up eastbound travelers. Interpretation would be on-demand and through nonpersonal services (e.g., printed materials). Visitors could register for scheduled off-bus activities such as Discovery Hikes.	Some open seats would be retained in the reservation system to allow for spontaneous trip planning for walk-in visitors. Some open seats would be retained on departing buses to pick up visitors along the Park Road. Visitors could register for scheduled off-bus activities such as Discovery Hikes. The Denali Visitor Center would be a regular stop on the eastbound transit schedule during operating hours. Drivers would provide key park messages, relevant information, and answers to questions. Self-guided tour materials would be available to all park visitors. Transit buses would be equipped with external bike racks to better accommodate cyclists and optimize seating. All transit buses would accommodate recreation and camping equipment, which may be carried externally.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Economy Tours	There would be no offering of a self-guided economy tour.	Combined with Transit; see above.	Self-guided economy tours would be provided via a dedicated bus system and would reach various destinations along the Park Road. Passengers would retain a seat on the same bus throughout the tour. Self-guided economy tours would originate at both the Wilderness Access Center and Denali Visitor Center. If space is available, eastbound tour buses could pick up hikers. Interpretation would include self-guided economy tour materials in the ticket price; supplemental electronic media; and site-specific, driver-determined narration.	Self-guided tour materials would be available for all park visitors, but a discrete self-guided economy tour would not be offered.
Premium Tours	Guided premium tours would include: Tundra Wilderness Tour (Toklat at mile 53 is the final rest stop, but 80% of this tour continues to Stony Overlook). Denali History Tour (goes to Primrose at mile 17).	Guided premium tours would include: Premium Short Tour: up to half a day in duration; offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika) with standardized topics and activities, and stop at the Denali Visitor Center.	Guided premium tours would include: A variety of options of different lengths and topics (e.g., general park overview, birding, and wolves) to meet the needs of diverse audiences. At least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter.	Guided Premium Tours would include, but not be limited to: Premium Short Tour: up to half a day in duration; offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika) with thematic narration and appropriate activities.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Premium Tours (continued)	Kantishna Experience (goes to Kantishna at mile 92). All tours would have at least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter. All tours would be fully narrated by a driver and/or naturalist providing the highest standard of interpretation, which may be supplemented by media and technology.	Premium Long Tour: full-day tour offered to destinations the length of the Park Road, but predominately operates within Wildlife Viewing Subzone 2 (Teklanika to Wonder Lake); a variety of tour topics and activities would be offered and tour destinations would be driven by visitor demand. Offerings could include off-bus activities with professional interpretive programs, guided talks at key locations, the use of media and technology, and opportunities to visit Denali Visitor Center, Toklat, or Eielson Visitor Center. All tours would have at least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter.	Fully narrated tour by a driver and/or naturalist providing the highest standard of interpretation, which may be supplemented by media and technology. Additional learning opportunities through off-bus experiences (e.g., guided walks and demonstrations).	Premium Long Tour: full-day tour offered to destinations along the length of the Park Road, but predominately operates within Wildlife Viewing Subzone 2 (Teklanika to Eielson), with thematic narration and appropriate activities. All tours would have at least one opportunity to visit an NPS interpretive facility or interact with an NPS interpreter. The Murie Science and Learning Center would offer specialized educational tours on a variety of topics.
Bus Size	There would be no changes to the size of the buses traveling the Park Road.	The Park Service might conduct a study to explore the effects of larger buses than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika).	The size and construct of premium tour bus equipment would be directed by the type of tour, but would not exceed the current design standard.	The Park Service might conduct a study to explore the effects of larger buses than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika).
Other Vehicle Use (The following management strategies represent the most restrictive actions that could be taken over the life of the plan)				
NPS Vehicles	Of the 10,512 vehicles allowed on the Park Road per season, 1,754 permits would be allocated for daily NPS operations. NPS access to duty stations on the restricted portions of	NPS access to duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) would be via an employee shuttle system. The transit system would be used by employee guests for access.	NPS employees could use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) during periods of low traffic volume.	Contractors and NPS operations would be managed to minimize displacement of visitors and prevent resource impacts. During periods of low traffic volume, NPS employees could

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
NPS Vehicles (continued)	the Park Road (Savage River to Wonder Lake) would be allowed via private vehicle. Contractor traffic needed for road repair or construction projects would be permitted to drive the Park Road and is not counted against the 10,512 limit.	Contractors and NPS operations would be managed (i.e., scheduling and volume of vehicle use) to minimize displacement of visitors and prevent resource impacts.	During periods of high traffic volume, employees would use the transit system. Employee guests could travel with employees or use the transportation system for access. Contractors and NPS operations would be managed to minimize displacement of visitors and prevent resource impacts.	use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake). During periods of high traffic volume, employees would use an employee transportation system (i.e., carpool or employee shuttle). Guests of employees could travel with employees or use the transportation system for access.
Professional Photography/Commercial Filming Vehicles	Professional Photography: up to five road permits per day would be distributed through a lottery system. Commercial Filming: managed through special use permits, which would be distributed at the discretion of park management.	Programs would be combined to provide greater equity in permit distribution and gain efficiencies in administration and oversight. Two private vehicle permits would be allowed each day for the entire Park Road, but managed for two distinct areas: Savage River to Toklat and Toklat to Wonder Lake. During periods of high traffic volume, permit holders would be required to use the transit system to avoid displacement of visitor opportunities and administrative functions.	Programs would be combined to provide greater equity in permit distribution and gain efficiencies in administration and oversight. Up to three permits would be available for the entire road, as long as the vehicles do not displace buses (or administrative vehicles if traveling at night); however, at no time may two or more professional photographer vehicles be stopped at the same location, except at night. During periods of high traffic volume, permit holders would be required to use the transit system to avoid displacement of visitor opportunities and administrative functions.	Programs would be combined to provide greater equity in permit distribution and gain efficiencies in administration and oversight. Up to five permits per day would be available for the entire road, as long as photographer vehicles do not displace buses or administrative traffic. Permits would not be issued during periods of known high traffic volume to avoid displacement of visitor opportunities and administrative functions. Permits would include conditions necessary to ensure standards for desired

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Professional Photography/Commercial Filming Vehicles (continued)				conditions are met (e.g., no more than one photographer vehicle at a wildlife stop, no parking in sheep crossing zones, and consideration of vehicles in the viewshed on the Park Road).
Commercial Use for Kantishna Inholders	Kantishna lodge permits for vehicle use of the Park Road, including day use, would be based on the general management plan and other management documents. Specific allocations for inholder vehicle use would be set annually in the *Superintendent's Compendium*.	Commercial authorizations would be issued to retain current levels of day tour service to each Kantishna lodge (not to exceed four per day total for all lodges combined).	One or more commercial authorization(s) would be issued for commercial day tours to Kantishna.	Concession contracts would be issued to offer commercial day tours to Kantishna.
Teklanika River Campground Vehicles	Visitors driving their own vehicles to Teklanika River Campground would be required to pay for a three-night minimum stay, and to otherwise use the transportation system to move throughout the park.	Private vehicles used to access Teklanika River Campground would travel westbound on the Park Road during a designated time. If needed, Teklanika River Campground would phase in a tents-only campground over a 10-year period with visitors using the transportation system for access.	Private vehicles used to access Teklanika River Campground would travel westbound on the Park Road only during designated periods of low traffic volume.	If needed to meet standards, private vehicles accessing Teklanika River Campground would travel on the Park Road during designated periods of low traffic volume.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Other Elements				
User Capacity and Adaptive Management	No formal program for adaptively managing user capacity would be implemented.	A formal program using indicators, standards, and adaptive management tools to protect the exceptional condition of the park's resources and values, as well as visitor experience would be implemented.	A formal program using indicators, standards, and adaptive management tools to protect the exceptional condition of the park's resources and values, as well as visitor experience would be implemented.	A formal program using indicators, standards, and adaptive management tools to protect the exceptional condition of the park's resources and values, as well as visitor experience would be implemented.
Costs	$3,522,000 Refer to appendix B for estimated costs of the alternatives.	$3,602,000 Refer to appendix B for estimated costs of the alternatives.	$3,602,000 Refer to appendix B for estimated costs of the alternatives.	$3,602,000 Refer to appendix B for estimated costs of the alternatives.

Table 4. Summary of Environmental Consequences

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Visitor Use and Experience	Alternative A would have a long-term, minor, beneficial impact on visitors' interpretive experience and safety as the current system provides access to interpretive services and a safe bus experience governed by strict adherence to road rules. The alternative would have long-term, minor, adverse impacts on other elements of visitor use and experience such as access to wilderness and other park features, cost of access, and visitors' transportation opportunities. The cumulative impacts of alternative A would be long-term, moderate, and beneficial. The impact of alternative A would make a significant contribution to the cumulative effects.	Alternative B could have a minor, adverse impact on access to wilderness due to transportation changes such as combining the transit system with an economy tour and not having configured camper buses. The alternative would have long-term minor, beneficial impacts on all other elements, including the cost of access, access to park features, visitors' transportation and interpretive experience, and visitor comfort. When combined with past, present, and reasonably foreseeable future actions, there would be long-term, moderate beneficial cumulative effects under alternative B, which would contribute substantially to the cumulative benefits.	Alternative C would have long-term, minor, beneficial impact on visitor access and a moderate beneficial impact on visitor use and experience. The actions under alternative C would contribute substantially to the long-term, moderate, beneficial cumulative effects.	Alternative D would result in a long-term, local and regionwide, minor, beneficial impact on visitor access, use, and experience. The actions under alternative D would contribute substantially to the long-term, moderate, and beneficial cumulative effects.
Transportation System and Traffic	Alternative A would have a local, long-term, minor, adverse impact on the transportation system due to transit bus capacity and Tundra Wilderness Tour, with bus capacity being exceeded some days during the peak season due to the existing vehicle limits.	Overall, alternative B would have a local and regional, long-term, moderate, beneficial impact on the transportation system and traffic by providing the framework for a modest increase in the seasonal capacity of the transportation system.	Alternative C would have a local, short-term, moderate, adverse impact on the transportation system due to the need to incorporate a separate self-guided tour bus system, the potential need to acquire different-sized buses to meet the demand of the various premium tours, and the need for increased	Overall, alternative D would have a local and regionwide, long-term, moderate, beneficial impact on the transportation system and traffic by providing the framework for a modest increase in the seasonal capacity of the transportation system.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Transportation System and Traffic (continued)	Overall, the local, long-term, minor, adverse impact of alternative A, when combined with the local, long-term, moderate, beneficial impacts of the other cumulative actions would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative A would contribute a small, adverse increment to overall cumulative impacts.	Overall, the local, long-term, moderate, beneficial impact of alternative B, when combined with the local, long-term, moderate, beneficial impacts of the actions described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative B would contribute a substantial benefit to overall cumulative impacts.	coordination among transit buses, self-guided tour buses, and premium tour buses. Over the life of this plan, alternative C would have a moderate local and regional beneficial impact on the transportation system and traffic by focusing on opportunities for specialty-themed tours, establishing an economy tour, and providing a slight increase to the seasonal capacity of the transportation system. Overall, the impacts of alternative C, when combined with the local, long-term, moderate, beneficial impacts of the actions described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative C would contribute a substantial beneficial increment.	Overall, the local, long-term, moderate, beneficial impact of alternative D, when combined with the local, long-term, moderate, beneficial impacts of the action described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative D would contribute a substantial benefit to overall cumulative impacts.
Wildlife and Wildlife Habitat	Alternative A would continue to result in a local, long-term, moderate, adverse impact on wildlife and wildlife habitat. These effects would primarily result from moving and parked vehicles along the Park Road and off-bus human activity at transportation nodes. The alternative would have adverse impacts on wildlife behavior and habitat use, movement, and stress levels.	Alternative B would have a local, long-term, moderate, adverse effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and probably increased, number of vehicles (moving or parked) on the Park Road and associated increases in off-bus human activity at transportation nodes. This impact includes a likely increase in adverse effects on wildlife during the daily off-peak hours and during the	Alternative C would have a local, long-term, moderate, adverse effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and likely increased, number of vehicles (moving or parked) on the Park Road throughout the season and associated probable increase in off-bus human activity at transportation nodes. This alternative would likely increase	Alternative D would have a local, long-term, moderate, adverse effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and probably increased, number of vehicles (moving or parked) on the Park Road and associated increases in off-bus human activity at transportation nodes. This alternative would likely increase adverse effects on wildlife

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Wildlife and Wildlife Habitat (continued)	Overall, there would be a local to regional, long-term, moderate, adverse cumulative impact on wildlife and wildlife habitat when the likely effects of alternative A are added to the effects of other past, present, and reasonably foreseeable future actions. Alternative A would contribute a long-term, medium, adverse increment to this cumulative impact.	shoulder seasons due to increased traffic during those periods. The alternative would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as adaptive management measures (e.g., use of indicators and standards, BACI studies) and reductions in private vehicle use. Overall, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat when the effects of alternative B actions are added to the effects of other past, present, and reasonably foreseeable future actions. Alternative B would contribute a long-term, medium, adverse increment to this cumulative effect.	adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons due to increased traffic during those periods. The alternative would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as adaptive management measures (e.g., indicators and standards, and BACI studies), a more protective management zone between Eielson and Wonder Lake, and reductions in private vehicle use. Overall, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat when the likely beneficial and adverse effects of alternative C actions are added to the effects of these other past, present, and reasonably foreseeable future actions. Alternative C would contribute a long-term, medium, adverse increment to this cumulative effect.	during the daily off-peak hours and during the shoulder seasons due to increased traffic during those periods. The alternative would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as comprehensive monitoring programs and adaptive management measures (e.g., use of indicators and standards, and a BACI study) and reductions in private vehicle use. Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, and local to regionwide adverse impacts on wildlife and wildlife habitat in the park. When the effects of alternative D actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat. Alternative D would contribute a long-term, medium, adverse increment to this cumulative effect.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Wilderness	Alternative A would result in a local, long-term, moderate, adverse effect on opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the Park Road, and from the continued concentrated human activity and imprints at and around the park's transportation nodes and the Park Road. Overall, when the effects of alternative A actions are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative A would contribute a substantial, long-term, adverse increment to this cumulative impact.	Alternative B would result in a local, long-term, moderate, adverse effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative B would also improve the preservation of wilderness character compared to alternative A from actions such as adaptive management measures and some reductions in private vehicle use. Overall, when the effects of alternative B actions are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative B would contribute a substantial long-term,	Alternative C would result in a local, long-term, moderate, adverse effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative C would also improve the preservation of wilderness character compared to alternative A due to actions such as adaptive management measures, the establishment of a more protective management zone between Eielson and Wonder Lake, and some reductions in private vehicle use. Overall, when the effects of alternative C actions are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-	Alternative D would result in a local, long-term, moderate, adverse effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative D would also improve the preservation of wilderness character compared to alternative A from actions such as adaptive management measures and some reductions in private vehicle use. When the effects of alternative D actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness.

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Wilderness (continued)		adverse increment to this cumulative effect on wilderness.	term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative C would contribute a substantial long-term, adverse increment to this cumulative effect on wilderness.	Alternative D would contribute a substantial, long-term, adverse increment to this cumulative effect on wilderness.
Park Management and Operations	In general, continuing park operations under the no-action alternative would have local, long-term, minor adverse impacts on park operations along the Park Road. When other past, present, and reasonably foreseeable future actions are combined with the impacts of alternative A, the cumulative effects would be short-term, moderate, and adverse, and long-term, minor, and beneficial. The no-action alternative would contribute minimally to these cumulative effects.	While there could be some short-term, moderate, adverse impacts on park operations and management as a result of implementing a new vehicle management program, it is anticipated that alternative B would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, moderate, beneficial effects. When the effects of past, present, and reasonably foreseeable future actions are combined with the impacts of alternative B, the cumulative effects would be long-term, moderate, and beneficial. Alternative B would contribute substantially to these cumulative impacts.	There would be some short-term, moderate, adverse impacts on park operations and management as a result of limiting staff travel during high-volume periods. It is anticipated that alternative C would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects. When the effects of past, present, and reasonably foreseeable future actions are combined with the impacts of alternative C, the cumulative effects would be long-term, moderate, and beneficial. Alternative C would contribute substantially to these impacts.	While there could be some short-term, moderate, adverse impacts on park operations and management as a result of implementing a new vehicle management program, it is anticipated that alternative D would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects. Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative D would be the same as those under alternative A. When combined with the long-term, moderate, beneficial impacts of alternative D, the cumulative effects would be long-term, moderate, and beneficial. Alternative D would contribute substantially to these impacts.
Socioeconomics	Implementation of alternative A would have little, if any, effect	The economic effects from alternative B on employment and	The economic effects from alternative C on employment and	The economic effects from alternative D on employment

	Alternative A: No Action	Alternative B: Optimizing Visitor Access	Alternative C: Maximizing Visitor Opportunities	Alternative D: NPS Preferred Alternative
Socioeconomics (continued)	on future local population growth, but would contribute to the temporary, major, seasonal population influx to the local area. Alternative A would also sustain existing linkages between park visitation, transit and tour system operations, the local and regional economy, the local communities, public facilities and services, and local government revenues over the foreseeable future. These linkages and their effects are long-term, major, and primarily beneficial at the local level, and long-term, moderate, and beneficial at the regional level. Combined with these effects, alternative A would result in local and regional, long-term, major, beneficial cumulative effects. Alternative A would contribute substantially to these effects.	income would be local and regional, long–term, major, and beneficial. Long-term social consequences include major increases in temporary/seasonal population and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area. When compared to alternative A, alternative B would result in minor, incremental, beneficial effects stemming from the increases in park and concessioner employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to materialize upon implementation of alternative B. The cumulative effects from an economic and social perspective, including alternative B, would be local and regional, long-term, major, and beneficial. Alternative B would contribute substantially to these effects.	personal income, would be local and regional, long–term, major, and beneficial. Long-term social consequences include major temporary/seasonal population influxes and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area. When compared to alternative A, alternative C would result in minor, incremental, beneficial effects stemming from the increases in park and concessioner employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to materialize upon implementation of alternative C. The cumulative effects, from an economic and social perspective, including alternative C, would be local and regional, long-term, major, and beneficial. Alternative C would contribute substantially to these effects.	and income would be local and regional, long–term, major, and beneficial. Long-term social consequences include major increases in temporary/seasonal population and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area. When compared to alternative A, alternative D would result in minor incremental beneficial effects stemming from the increases in park and concessioner employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to materialize upon implementation of alternative D. The cumulative effects from an economic and social perspective, including alternative D, would be local and regional, long-term, major, and beneficial. Alternative D would contribute substantially to these effects.

USER CAPACITY AND ADAPTIVE MANAGEMENT

Generally, the process of managing user capacity in national parks involves not only an assessment of visitor numbers, but also analyzes where they go, what they do, and the "footprints" they leave behind. It is a dynamic process of planning for and managing the various characteristics of visitor use and park areas, and employs a variety of adaptive management strategies and tools to sustain desired conditions.

The decision-making process for addressing user capacity is a form of adaptive management and can be summarized by the following major planning and management steps (see figure 10):

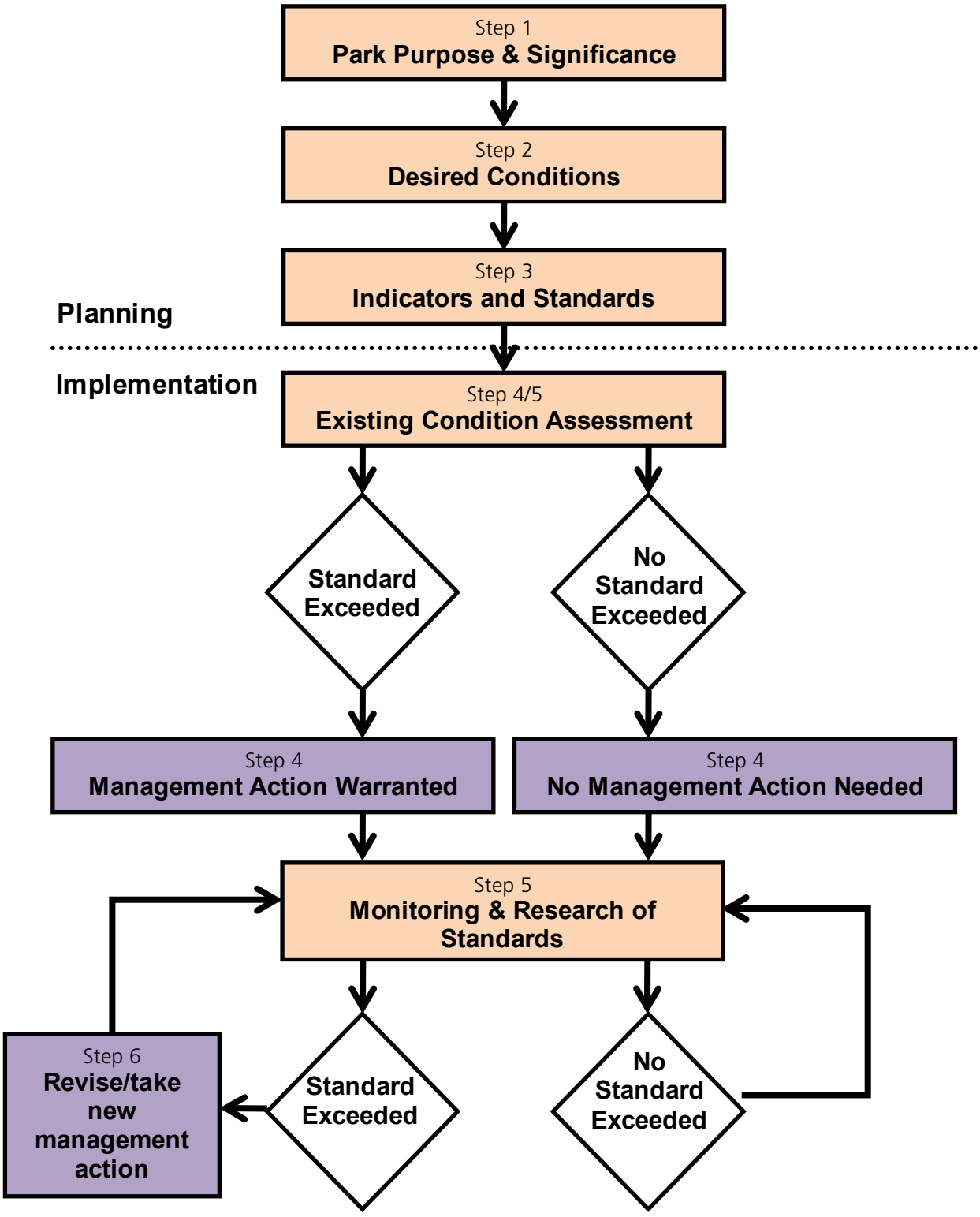
1. Determining WHY an area was established as a national park.
2. Determining WHAT desired conditions for resources, visitor experiences, and types/levels of development should exist within the park.
3. Further articulating desired conditions by identifying indicators and standards that help direct management actions and serve as long-term measures of success at achieving desired conditions.
4. Determining HOW the park will be managed to achieve the desired conditions by defining and implementing visitor use management strategies and actions.
5. Monitoring existing conditions using indicators and standards.
6. Adjusting management actions to maintain desired conditions.

The goal of this adaptive management process is to protect the exceptional condition of the park's resources and values, as well as visitor experiences, through informed, proactive, and transparent management. The strategy is designed to detect changes to important indicators that may be caused by adjustments in the transportation system on the Park Road, and to provide park managers with a method to adaptively manage traffic to address any changes in conditions.

Steps 1 and 2 have already been established for the park as part of other planning efforts and are included in chapter 1. During the planning phase for this project, the interdisciplinary planning team identified indicators and standards (step 3) for managing vehicles based on the park's purpose, significance, special mandates, desired conditions identified for management zones along the Park Road, and information gathered during ongoing studies (see table 1). An indicator is a measurable variable that can be used to track changes in resource and social conditions related to human activity so that existing conditions can be compared to desired conditions. A standard is the minimum acceptable condition for an indicator. The indicators and standards help translate the broader qualitative descriptions of desired conditions in the management zones into measurable conditions. As a result, park managers can track changes in resource conditions and visitor experiences, and provide a basis for the park staff to determine whether desired conditions are being met.

A number of discrete social and wildlife indicators would be monitored as part of this strategy. In addition, a BACI study design would be employed to detect changes in natural conditions. A BACI study is based on the principle that if two locations (control and impact) are monitored before and after a human-caused disturbance (in this case an experimental change in the transportation system), the impact location may show a different pattern after the disturbance than the control site (Underwood 1994; Smith

Figure 10. Adaptive Management Framework



2002). BACI studies measure the change in the differences among sites between the two time periods (before and after impact) rather than measuring the overall magnitude of difference between the sites, thereby controlling for differences unrelated to the impact of interest. Park managers can then attribute changes in conditions to the management action if, after the action, the conditions at the impact site differ substantially from the control.

Prior to implementing any proposed change in schedule (step 4), a micro-simulation model (developed using GPS data from buses and other vehicles) would be used to test if a new schedule and the corresponding change (either increase or decrease) in traffic volume meets the standards set for the indicators (Morris et al. 2010). After testing, the schedules could be adjusted such that, based on the simulations, they appear to meet the standards.

Given the inherent uncertainty in this system, implementation of any of the action alternatives would be done in phases, building up to the full increase in traffic volume suggested possible by the simulation model. Of the full increase over current levels considered possible, only a portion of that difference in traffic volumes would be realized at any one time, and the impacts monitored and analyzed before additional increases are attempted.

Upon implementation of a new schedule, monitoring (step 5) would be conducted to ensure standards are being met with the corresponding change in traffic volume (whether that change is an increase or a decrease).

Subsequently, if trends indicate standards are or could be exceeded, the Park Service would respond with a decrease in traffic levels, as necessary. Various management strategies (step 6) could be used depending on the specific indicator(s) of concern, as identified in the following sections.

Initial monitoring of the indicators would also help determine if they are accurately measuring the conditions of concern and if the standards truly represent the minimally acceptable condition of the indicator. Park staff might decide to modify the indicators or standards and revise the monitoring program if better ways are found to measure changes caused by visitor use. Most of these types of changes should be made within the first several years of initiating monitoring. After this initial testing period, adjustments would be less likely to occur. However, given the level of assessment that has already been done on the proposed indicators for the Park Road, it is unlikely that much adjustment would be needed.

If conditions change appreciably, park staff might need to identify new indicators to ensure desired conditions are achieved and maintained. This iterative learning and refining process is a strength of the NPS user capacity and adaptive management program. Information on the NPS monitoring efforts, related visitor use management actions, and any changes to the indicators and standards would be made available to the public. All revisions to established indicators and standards would be subject to compliance with the National Environmental Policy Act; the National Historic Preservation Act; and other laws, regulations, and policies.

The following sections describe each of the indicators, their rationale for selection, and proposed monitoring techniques. More detail on the indicators is provided in appendix C. These sections are then followed by a table summarizing the standards associated with each indicator.

VISITOR EXPERIENCE INDICATORS AND STANDARDS

Indicators and standards for visitor experience would be associated with the following issues:

- number of vehicles at wildlife stops
- number of vehicles in viewsheds
- number of vehicles at rest stops
- hiker wait time

As part of the Road Capacity Study, researchers from the University of Vermont (UVM) conducted qualitative visitor surveys in 2006 to identify factors that are important to visitor satisfaction and that would make for readily measurable indicators. Based on the results of this survey, and subsequent quantitative surveys in 2007, the selected factors were the number of vehicles at wildlife stops, in iconic viewscapes, and at rest stops. Four viewsheds—Teklanika, Highway Pass, Stoney, and Grassy Pass—were identified as the indicator viewscapes, and each contains one or more miles of the Park Road (the exact length of road visible for each viewscape varies). The Teklanika Rest Stop, Toklat Rest Stop, and Eielson Visitor Center were identified as the indicator rest areas that would be monitored.

Once a schedule is implemented, monitoring would occur multiple times per season for these indicators, both remotely (e.g., using GPS on vehicles, traffic counters) and directly (e.g., periodic staff monitoring along the road, at viewsheds, at rest stops, in government vehicles, and on buses). If trends indicate the standards for these indicators are or could be exceeded, the Park Service could respond with a decrease in traffic levels as necessary. As described in "Actions Common to All Alternatives," transit opportunities would be given priority over tour opportunities if a decrease is necessary, and various management strategies could be used to achieve this. These strategies could include changes to nonsystem uses described in the alternatives or changes to the transportation system schedule, such as removal of buses from the schedule or stepping the system back to the level it was last operating at when not exceeding the standards. Any such changes would occur between seasons.

Controlling the wait time for eastbound hikers reboarding buses requires an adequate number of buses passing by in a given hour along the full length of the road and those buses having room on them to pick up additional passengers. Because of this, wait time for hikers is also an effective indicator for the ability of visitors to acquire a seat. If hiker wait times begin to consistently approach or exceed the standard, it would be an indication that there is not adequate transit service.

Regularly throughout the season, the operator of the transportation system would be required to monitor wait times on an ongoing basis along the Park Road with spot checks by park staff. If trends indicate the standard for this indicator is or could be exceeded, the Park Service would respond with various management strategies, including leaving more empty seats on buses, adding more buses (only if it would not cause crowding standards to be exceeded), using "deadheads" or empty buses that would minimize impacts on the crowding standards, or reducing tour and nonsystem use to add transit.

As noted previously, if modeling or monitoring indicate the potential for an increase in traffic volume on the Park Road, and the demand for the increase exists, any such increase would be done in phases. The impacts of each incremental increase would then be monitored and analyzed relative to the indicators and standards before additional increases are attempted.

RESOURCE INDICATORS AND STANDARDS

Indicators and standards for resources would be associated with the following issues:

- sheep gap spacing
- nighttime traffic levels
- natural resource condition

Studies of sheep behavior in the park have shown that traffic can inhibit sheep from crossing the road in their migratory or daily movements. As a result, the park is proposing an indicator that would require a gap in traffic each hour for a minimum length of time. Critical locations along the road corridor are known crossing points and these would be monitored to ensure the gap is occurring. Once a schedule is implemented, monitoring would occur multiple times per season, both remotely (e.g., using GPS on vehicles and traffic counters) and directly (e.g., periodic staff monitoring at critical sheep crossing sites during peak traffic volumes).

If trends indicate the standards for sheep gap spacing are or could be exceeded, the Park Service would respond with a decrease in traffic levels as necessary. As described in "Actions Common to All Alternatives," transit opportunities would be given priority over tour opportunities if a decrease were necessary, and various management strategies could be used to achieve this. These strategies could include changes to nonsystem uses described in the alternatives, changes to the transportation system schedule, removal of buses from the schedule, or stepping the system back to the level it was last operating at when not exceeding the standards. Any such changes would occur between seasons.

Currently, normal nighttime traffic levels (10:00 p.m. to 6:00 a.m.) are very low (two or less vehicles per hour based on traffic counters). Analyses have shown that unusually high nighttime traffic levels (greater than four vehicles per hour) have a strong correlation with decreased wildlife sightings the following morning, indicating a disturbance to wildlife along the road corridor. These data are from days after quiet nights (a night when the Park Road was closed to all traffic) as well as after construction projects on the Park Road and periods of low night traffic; these data would continue to be used to refine associated standards.

The nighttime standard would undergo further analysis to ensure it does not impact wildlife sightings the following morning and would be lowered if an impact is detected. To further understand the relationship between nighttime traffic and wildlife sightings the following morning, there would be brief exemptions from this standard for periods not to exceed two weeks and no more than two exemption periods in an operating season for the purpose of experimental increases in traffic.

Different standards would occur for large vehicles (vehicles greater than a gross vehicle weight rating of 80,000 pounds at no more than four per hour (e.g., a semi-truck hauling fuel)) and for other traffic levels, because the nature of these vehicles (large construction vehicles produce more noise and move more quickly than visitor buses typically do) make them a greater concern for park management. Remote monitoring of vehicle numbers would be conducted using traffic counters along the Park Road multiple times per season.

Although their complex nature does not allow a particular standard to be identified, indicators for natural resource conditions would also be established because changes in vehicle numbers and traffic behavior may affect natural resources, such as wildlife. As a result, the purpose of this indicator is to ensure no degradation or change in natural resource conditions occurs due to traffic patterns.

Using a BACI study, park managers can attribute resource impacts on the management action if, after the action, there is a substantial change in the observations before the action. Multiple parameters would be monitored after a change is implemented as part of the BACI study

- distribution, number, and type of wildlife sightings, including distance from the road (based on ongoing park staff and bus driver observation)
- discrete studies of grizzly bear and Dall sheep movement rates when crossing the Park Road, distribution of bear inactivity periods relative to the road, and the probability and timing of sheep crossings (all based on GPS data)
- ongoing population surveys for caribou, moose, Dall sheep, and wolves, along with the collection of certain demographic data

A science advisory team would be formed and would review BACI study monitoring data to analyze whether observed changes are of concern. If trends indicate substantial changes in wildlife parameters after changes to the transportation system are implemented, traffic levels could be reduced, and various management actions could be taken to accomplish this. These actions could include changes to nonsystem uses described in the alternatives or changes to the transportation system schedule, including removal of buses from the schedule or stepping the system back to the level it was last operating at when not exceeding the standards. These changes would occur between seasons.

As with visitor experience indicators and standards, if modeling or monitoring of resource indicators and standards indicates the potential for an increase in traffic volume on the Park Road, and the demand for the increase exists, any such increase would be done in phases (see table 5). The impacts of each incremental increase would then be monitored and analyzed relative to the indicators and standards before additional increases are attempted.

Table 5. Standards for Visitor Experience and Resource Indicators

Indicator	Standard		
	Wildlife Viewing Subzone 1	**Wildlife Viewing Subzone 2**	**Wildlife Viewing Subzone 3**
Number of vehicles at a wildlife stop	At least 75% of wildlife stops will have three or fewer vehicles, averaged over five years. No one year will have less than 70% of wildlife stops with three or fewer vehicles.	At least 75% of wildlife stops will have two or fewer vehicles, averaged over five years. No one year will have less than 70% of wildlife stops with two or fewer vehicles.	At least 75% of wildlife stops will have one or fewer vehicles, averaged over five years. No one year will have less than 70% of wildlife stops with one or fewer vehicles.
	At least 90% of wildlife stops will have four or fewer vehicles, averaged over five years. No one year will have less than 85% of wildlife stops with four or fewer vehicles.	At least 90% of wildlife stops will have three or fewer vehicles, averaged over five years. No one year will have less than 85% of wildlife stops with three or fewer vehicles.	At least 90% of wildlife stops will have two or fewer vehicles, averaged over five years. No one year will have less than 85% of wildlife stops with two or fewer vehicles.
	At least 95% of wildlife stops will have five or fewer vehicles, averaged over five years. No one year will have less than 90% of wildlife stops with five or fewer vehicles.	At least 95% of wildlife stops will have four or fewer vehicles, averaged over five years. No one year will have less than 90% of wildlife stops with four or fewer vehicles.	At least 95% of wildlife stops will have three or fewer vehicles, averaged over five years. No one year will have less than 90% of wildlife stops with three or fewer vehicles.
Number of vehicles in a viewscape	At least 85% of the time during bus operating hours, there will be three or fewer vehicles visible in the mile 26 viewshed. No one year will have less than 80% of the time during bus operating hours having three or fewer vehicles visible in the mile 26 viewshed.	At least 85% of the time during bus operating hours, there will be two or fewer vehicles visible in the miles 55 and 62 viewsheds. No one year will have less than 80% of the time during bus operating hours having two or fewer vehicles visible in the miles 55 and 62 viewsheds.	At least 85% of the time during bus operating hours, there will be one or fewer vehicles visible in the mile 68 viewshed. No one year will have less than 80% of the time during bus operating hours having one or fewer vehicles visible in the mile 68 viewshed.
	At least 95% of the time during bus operating hours, there will be four or fewer vehicles visible in the mile 26 viewshed.	At least 95% of the time during bus operating hours, there will be three or fewer vehicles visible in the miles 55 and 62 viewsheds.	At least 95% of the time during bus operating hours, there will be two or fewer vehicles visible in the mile 68 viewshed.

Indicator	Standard		
	Wildlife Viewing Subzone 1	**Wildlife Viewing Subzone 2**	**Wildlife Viewing Subzone 3**
Number of vehicles in a viewscape (continued)	No one year will have less than 90% of the time during bus operating hours having four or fewer vehicles visible in the mile 26 viewshed.	No one year will have less than 90% of the time during bus operating hours having three or fewer vehicles visible in the miles 55 and 62 viewsheds.	No one year will have less than 90% of the time during bus operating hours having two or fewer vehicles visible in the mile 68 viewshed.
Number of vehicles parked at one time at			
Teklanika Rest Stop	No more than 12 buses at one time with a total of no more than 16 vehicles.		
Toklat Rest Stop		No more than 11 buses at one time with a total of no more than 16 vehicles.	
Eielson Visitor Center		No more than 10 buses at one time with a total of no more than 19 vehicles.	
Hiker wait time	At least 75% of hikers will have wait times of less than 30 minutes for pickup by a bus, averaged over five years. No one year will have less than 70% of hikers with wait times of less than 30 minutes.		
	At least 95% of hikers will have wait times less than 60 minutes for pickup by a bus, averaged over five years. No one year will have less than 93% of hikers with wait times of less than 30 minutes.		
	At least 99% of hikers will have wait times of less than 90 minutes for pickup by a bus, averaged over five years. No one year will have less than 98% of hikers with wait times of less than 90 minutes.		
Sheep gap spacing	Milepoint 21.6 will have at least a 10-minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps), averaged over five years. No one year will have less than a 90% success rate (22 of 24 hours).	Milepoints 37.6, 52.8, and 60.6 will have at least a 10-minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps), averaged over five years. No one year will have less than a 90% success rate (22 of 24 hours).	Milepoint 68.5 will have at least a 10-minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps), averaged over five years. No one year will have less than a 90% success rate (22 of 24 hours).

Indicator	Standard		
	Wildlife Viewing Subzone 1	Wildlife Viewing Subzone 2	Wildlife Viewing Subzone 3
Nighttime traffic	There will be an average of three vehicles or fewer per hour (total westbound and eastbound) passing any of the traffic counters west of Savage between 10:00 p.m. and 6:00 a.m., with a 95% success rate, and with never more than six vehicles in any one hour, also with a 95% success rate. This limit will undergo further analysis to ensure it does not impact wildlife sightings the following morning and will be lowered if an impact is detected. To further understand the relationship between nighttime traffic and wildlife sightings the following morning, for the first two years following implementation of the plan only, there may be brief exemptions from this standard for periods not to exceed two weeks and no more than two exemption periods in an operating season for the purpose of experimental increases in traffic.		
Large vehicles	There will be no more than four vehicles (total westbound and eastbound) larger than 80,000 pounds gross vehicle weight rating (GVWR) in any one hour passing any of the traffic counters west of Savage. This limit will undergo further analysis to ensure it does not impact wildlife sightings the following morning and will be lowered if an impact is detected. These limits will undergo further analysis to ensure they do not impact wildlife sightings the following morning and will be lowered if an impact is detected.		

Notes: To accommodate unique circumstances, all standards (except those associated with BACI indicators) consider a desired success rate that would allow for a small percentage of violations before management action is taken.

ALTERNATIVES AND ACTIONS CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

Other alternatives and actions to address vehicle management within the park were discussed based on the results of internal and external scoping. However, these options were dismissed from further consideration for one or more of the following reasons, as described below:

- Their inability to meet the purpose of and need for the project, and support the planning goals and objectives.
- A lack of a direct connection to the protection of park resources and enhancement of visitor experiences.
- Having more adverse impacts than other alternatives being considered.
- Technical or economic infeasibility.

TRANSIT ONLY

The goal of this alternative would be to emphasize transit, thus providing increased access to wilderness recreational opportunities, one of the park's fundamental resources and values. By providing transportation on the Park Road only on transit buses, all visitors would be encouraged to get on and off the bus, maximizing their freedom to interact with and discover park resources. Minimal interpretation would be provided, encouraging independent learning opportunities.

Maintaining transit access is a critical component to the Denali transportation system. However, many visitors come to Denali because guided tours are offered along the Park Road. The tours provide a high level of education and support services, which is appealing to a large segment of the visiting public. In addition, facilitated access to the park's wilderness resources is desirable by many, particularly those who may have limited outdoor skills or mobility. Denali is considered one of the most accessible of Alaska's national parks, in large part because of these tour opportunities.

By excluding tour opportunities in a "transit only" alternative, some visitors' needs would not be met, and it is likely that some portion of future potential visitors to Denali would be displaced. Those who do visit would have limited options for tailoring a trip on the Park Road to meet their particular needs. Further, the level of educational opportunities available along the Park Road would be significantly reduced. Finally, the current tour operations subsidize the transit system (Denali National Park Commercial Services Division, pers. comm.). If tours were eliminated, these subsidies would be eliminated as well, compromising the ability to sustain transit operations without subsidies from another source.

This alternative was dismissed prior to full analysis because it would not meet the purpose and need for this planning effort. In particular, this alternative would not meet several of the planning objectives, including providing opportunities for the full range of park visitors, allowing visitors to easily choose the experience that meets their needs, and providing an affordable and financially sustainable transportation system.

ALL SERVICES ON ONE BUS

The goal of this alternative would be to combine services on one bus and promote greater choice in scheduling. It would necessitate that all visitors traveling the Park Road ride a bus on which a premium tour is conducted by a trained interpreter. This alternative would provide two distinct

services (premium tour and transit) on one bus with services reaching Teklanika, Toklat, Eielson, Wonder Lake, and Kantishna. Space for transit riders would be reserved on every bus. Affordability would be maintained through a differential pricing structure based on when a ticket was purchased and the destination.

The benefits of this alternative include more scheduling choices for visitors and increased efficiency of the transportation system. Further, it would ensure that all visitors receive interpretation, and that visitors to Kantishna would have equal bus access. However, this alternative was not well received during public review of the preliminary management concepts. Several commented that it penalized those visitors who plan ahead since the differential pricing structure was based on when the ticket was purchased, as well as the location served. Many visitors could postpone confirming reservations in order to secure a lower-priced seat, complicating trip planning and system operations.

The public also expressed concerns about potential conflicts between tour and transit riders when combined on the same bus. In particular, stopping frequently to pick up transit passengers, and making room for hiking and camping gear, may detract from tour riders' experiences. The potential reduction in seating availability to pick up transit riders and boarding a fuller bus oriented toward educational opportunities may detract from transit riders' experiences. Because this alternative would not enhance visitor experience along the Park Road, and could even degrade it, this alternative would not meet the purpose and need for this planning effort, and was dismissed from further analysis.

AN ADAPTIVE MANAGEMENT FRAMEWORK INTEGRATED WITH CURRENT VEHICLE USE LIMITS

The goal of this alternative would be to integrate an adaptive management framework, using indicators and standards, with the park's existing use limit for vehicles on the Park Road. This alternative would continue current management strategies of limiting the number of vehicles based on the 1986 general management plan, which established a seasonal limit of 10,512 vehicles on the Park Road. In addition, indicators and standards related to the park's physical, biological, and social environment would be used to help managers adjust the transportation system operations within the 10,512-vehicle limit.

The purpose of the adaptive management approach is to effectively protect resources and provide high-quality visitor experiences through informed, proactive, and transparent management. Using science, monitoring, and modeling techniques, park managers have the flexibility to adjust operations in response to observed resource protection or visitor use issues.

The value of this approach would be the ability to greatly improve the expected performance of the managed system by reducing uncertainty about possible influences on resources and visitor experiences. Managing the permitted volume of vehicles on the Park Road, based on an understanding of current and desired conditions, is an important part of this adaptive management approach, along with other strategies such as managing the frequency, timing, and type of vehicles.

Although the adaptive management approach would include managing the permitted volume of vehicles, the current limit of 10,512 vehicles per season is not directly tied to desired conditions, or an expanded understanding of the impacts of traffic volume and traffic patterns on the park's physical,

biological, and social environment. Continued adherence to this existing vehicle limit reduces the ability of park managers to fully enhance performance of the park's transportation system, protect resources, and provide high-quality experiences. As a result, although the concept of adaptive management was carried forward in the plan as part of the action alternatives, the alternative that combined adaptive management with the park's existing use limit for vehicles on the Park Road was dismissed prior to full analysis.

OTHER ALTERNATIVE ELEMENTS

Key elements from the "Experience Key Park Destinations" and "Diversity of Opportunities" concepts presented in the early 2010 planning workbook were incorporated into the current action alternatives. Therefore, these alternatives were dismissed as stand-alone alternatives.

During public scoping, comments were received indicating the Park Service should return to a free shuttle bus system. However, NPS transportation systems need to support themselves, so collectively, the shuttle and tours must be financially sustainable (Denali National Park Commercial Services Division, pers. comm.). Currently, the tours subsidize the transit system, and to keep tour prices reasonable and contribute to sustainability of the overall system, a fee is assessed for use of the shuttles. Therefore, this alternative element was not considered further.

Other elements of alternatives discussed during public scoping (e.g., fuel efficiency, comfort, quieter buses, family-friendly opportunities, flexibility, and better access to information about visitor opportunities) are all addressed as elements common to all action alternatives, and would be pursued through the concessions prospectus.

Management of vehicles during the shoulder season and winter use of the road were not considered because they are outside of the scope of this plan / environmental impact statement, which pertains to management during the peak season (i.e., May through September).

CONSISTENCY OF THE ALTERNATIVES WITH THE PURPOSES OF THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act requires an analysis of how each alternative meets or achieves the purposes of the act, as stated in section 101(b). Each alternative analyzed in a NEPA document must be assessed as to how it meets the following purposes:

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The Council on Environmental Quality has promulgated regulations for federal agencies' implementation of the National Environmental Policy Act (40 CFR 1500 – 1508). Section 1500.2 states that federal agencies shall, to the fullest extent possible, interpret and administer the policies, regulations, and public laws of the United States in accordance with the policies set forth in the act (sections 101(b) and 102(1)); therefore, other acts and NPS policies are referenced as applicable in the following discussion.

Criterion #1. Fulfill the Responsibilities of Each Generation as Trustee of the Environment for Succeeding Generations

All alternatives considered in this plan / environmental impact statement, including the no-action alternative (alternative A), must comply with NPS laws and policies (e.g., the Organic Act of 1916 and NPS *Management Policies 2006*) that require the agency to manage parks by such means and in such a manner "that will leave them unimpaired for the enjoyment of future generations." Other laws also apply at Denali National Park that require management of wilderness to ensure resources are protected for future generations, including the Wilderness Act.

The Wilderness Act, states that it is "…declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness."

Each alternative meets this criterion, although adaptive management per scientifically based indicators and standards under alternatives B, C, and D would likely enhance the Park Service's ability to meet this criterion.

Criterion #2. Assure for All Americans Safe, Healthful, Productive, and Esthetically and Culturally Pleasing Surroundings

Adherence to road design and maintenance standards, required under all alternatives,

would assure safe conditions along the Park Road, while protecting the historic features of the road. These standards would also ensure the experience along the road is esthetically and culturally pleasing. The requirement that all bus drivers, including inholder lodge drivers, have the same level of safety training for driving the Park Road under alternatives B, C, and D would likely enhance the Park Service's ability to meet this criterion when compared to alternative A. Also, the management of user capacity and implementation of an adaptive management program under the action alternatives would increase the ability of the Park Service to ensure natural resources are protected and visitor satisfaction is maintained, further assuring healthful and esthetically pleasing surroundings.

Criterion #3. Attain the Widest Range of Beneficial Uses of the Environment without Degradation, Risk of Health or Safety, or Other Undesirable and Unintended Consequences

All three action alternatives would attain a wide range of visitor uses along the Park Road, from access to wilderness recreational opportunities to guided tour experiences. As described for criterion 2, adherence to road design and maintenance standards would ensure all alternatives provide for the safety of visitors, while protecting the historic character of the Park Road, including protection from undesirable and unintended consequences. When compared to alternative A, the management of user capacity and the adaptive management program under alternatives B, C, and D would provide managers with the flexibility to better ensure that visitor activities along the Park Road would occur without degradation of natural resources, and would minimize undesirable and unintended consequences for visitor satisfaction.

Criterion #4. Preserve Important Historic, Cultural, and Natural Aspects of Our National Heritage and Maintain, Wherever Possible, an Environment that Supports Diversity and Variety of Individual Choice

Adherence to applicable laws and policies, as described for criteria 1 and 2, would ensure that all alternatives preserve the historic and cultural aspects of the Park Road, as well the natural resources along the Park Road. By managing user capacity and implementing an adaptive management program, alternatives B, C, and D would provide flexibility to better preserve these resources when compared to alternative A. Although all of the alternatives provide a variety of individual choices, from access to wilderness recreational opportunities to guided tour experiences, alternatives B, C, and D better support diversity and variety of individual choice by optimizing visitor access and maximizing visitor opportunities.

Criterion #5. Achieve a Balance between Population and Resource Use that Will Permit High Standards of Living and a Wide Sharing of Life's Amenities

Although all three action alternatives would provide opportunities to experience the wilderness of Denali National Park while protecting park resources and values, alternative B would provide the most opportunity for a variety of users to access the park. The management of user capacity and the adaptive management program under alternatives B, C, and D would better ensure a balance is achieved when compared to alternative A by providing managers with the flexibility to adjust the transportation system as necessary to meet desired conditions.

Criterion #6. Enhance the Quality of Renewable Resources and Approach the Maximum Attainable Recycling of Depletable Resources

This criterion is not applicable to this plan for management of vehicles along the Park Road at Denali National Park and Preserve.



Chapter 3
The Affected Environment

INTRODUCTION

SCOPE OF ANALYSIS

The "Affected Environment" chapter describes the existing environment and the current condition of those resources and values that would be affected by implementing the actions considered in this plan / environmental impact statement. These resources include visitor use and experience, the transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, and socioeconomics. Because the alternatives in this plan / environmental impact statement relate to the management of vehicles along the Park Road, the discussion of the affected environment is generally limited to those resources within or near the road corridor. Exceptions include the topics of visitor use and experience and socioeconomics, which extend beyond the road corridor.

GENERAL SETTING

Denali National Park and Preserve is dominated by three physiographic provinces in central Alaska: the Alaska Range, northern foothills of the Alaska Range, and the Tanana-Kuskokwim Lowlands; while small portions of the park extend into the Cook Inlet-Susitna Lowlands, the Broad Pass Depression, and the Kuskokwim Mountains. The Park Road corridor itself passes through the mountains and tundra on the northern slopes of the Alaska Range, which forms the northernmost portion of the Pacific Mountain System. The Alaska Range is one of the great mountain uplifts in North America, rising to the pinnacle of Mount McKinley at 20,320 feet. Mount Foraker is the second highest peak, rising to 17,400 feet, while nearby Mount Hunter, the third highest, is 14,573 feet high. In addition, numerous peaks in the vicinity of Mount McKinley stand at elevations of 10,000 to 13,000 feet.

The northern foothills of the Alaska Range consist of a series of east-west trending ridges, starting with the Kantishna Hills and running eastward. Summit altitudes generally range between 2,000 and 6,200 feet. The foothills vary from 3 to 7 miles in width and from 5 to 20 miles in length (NPS 2005). The foothills are separated by broad flat valleys, which range from 2 to 10 miles in width.

Another prominent feature of the geology of the area is extensive glaciation in the Alaska Range. The range is perpetually snowclad above approximately 7,500 feet on the north and 6,000 feet on the south. Glaciers are numerous and tend to be larger and longer on the south side of the range than on the north. The larger glaciers range from 35 to 45 miles in length and include the Kahiltna (the largest), Ruth, Eldridge, Tokositna, Yentna, and Muldrow. On the north side of the Alaska Range beyond the existing glaciers, morainal and glacial outwash deposits extend into the foothills belt and cover large areas of bedrock. Except for some valleys, the foothills section was never glaciated.

Denali straddles two of the four major climatic zones of Alaska – the transitional maritime zone south of the Alaska Range and the continental zone in the interior north of the range. The Alaska Range exerts a major influence on the climate of the interior by blocking much of the moisture that sweeps inland from the Gulf of Alaska. Therefore, the north side of the park and preserve is characterized by less precipitation and greater fluctuations in temperature (hotter in summer and colder in winter) than the south side.

Winters are cold, particularly north of the Alaska Range where temperatures at park headquarters have reached -52°F. The average maximum temperature for January is 13°F, while the average minimum is -5°F. During summer, up to 20 hours of daylight provide

many opportunities to enjoy the park, and temperatures have been as high as 90°F. The average maximum temperature for July is 66°F and the average minimum is 44°F.

Precipitation at park headquarters averages about 15 inches annually with an average snowfall of 76 inches. However, the total precipitation exceeds 80 inches in some locations (e.g., the south side of the Alaska Range and higher elevations), and snowfall exceeds 400 inches. Rainfall occurs on an average of 21 days each month during June, July, and August at the McKinley Park recording station. Sudden showers and thunderstorms occur occasionally and flash floods can occur throughout the region.

VISITOR USE AND EXPERIENCE

Hundreds of thousands of people visit Denali National Park each year. Approximately 75% of those visitors experience the park via the unpaved portion of the Denali Park Road. The Denali Park Road—a 92-mile path into 6 million acres of wildlands—is the route of most visitors' only glimpse into the vast landscape of Denali. Following is a description of the current state of visitor access, use, and experience on the Denali Park Road.

THE DENALI PARK ROAD VISITOR

Visitation to Denali National Park as a whole has ranged from approximately 350,000 to more than 450,000 annual visitors during the past five years, with a high of 463,149 visitors in 2007. Table 6 shows annual Denali visitation from 2005 to 2010.

Table 6. Total Recreation Visits for Denali National Park and Preserve, 2005–2010

Year	Total Recreation Visits to the Park
2005	403,520
2006	415,935
2007	463,149
2008	432,309
2009	358,041
2010	377,686

These general visitation figures reflect the number of recreational visitors coming to the entire park annually. Some of those visitors, however, include people visiting only southern areas of the park, south of the Alaska Range that effectively divides the park in half. Typical visitors to these areas away from the Park Road include visitors on scenic air tours and mountaineers on expeditions into Mount McKinley and the Alaska Range.

To examine more specifically how many people visit the Park Road area, the focus of this analysis, a subset of the visitation data is used. Table 7 describes the number and type of users that are in the Park Road area of Denali.

The typical visitor to the Denali Park Road corridor is a retiree traveling in a cruise-land tour package. This visitor portrait is in striking contrast to the profile of the average visitor to other parts of Denali. According to visitor surveys conducted in the summer of 2006 (DCED 2007), 36% of survey respondents were 61 or older. These numbers, however, include all summer visitors, including mountaineering and other nonroad visitors. The percentage would likely be higher when examining retirees as a percentage of road visitors only. In addition, 59% of the total visitor base is part of a land excursion from a major cruise ship company such as Holland America, Princess, and Royal Celebrity cruise lines.

The average visitor to the Park Road area is transported to the park by either the Alaska Railroad or a cruise company motor coach, and arrives at their cruise company's hotel, typically either in Nenana Canyon or in McKinley Village, outside the park entrance. Independent travelers may arrive in the park via private vehicle, by hotel courtesy shuttle, or by train on the Alaska Railroad. Train passengers disembark at the train depot, next to the Denali Visitor Center. As most visitors, both independent travelers and package tour visitors, arrive in Alaska without a private vehicle, transportation modes such as the Alaska Railroad are key to Denali visitation. In 2007, for example, approximately 173,500 visitors arrived in Denali by train. Approximately 30% of those visitors arrived from Anchorage, 42% arrived from Fairbanks, and smaller percentages arrived from Talkeetna and Whittier.

Table 7. Seasonal Recreation Visitors to the Denali Park Road

	NUMBER OF PEOPLE, 2005–2010					
	2005	**2006**	**2007**	**2008**	**2009**	**2010[1]**
Bus Riders						
Visitor Transportation System	83,786	76,965	84,590	82,833	66,798	73,989
Tundra Wilderness Tour	123,675	97,347	127,668	121,695	91,857	98,473
Denali Natural History Tour	67,280	105,540	88,274	74,684	79,080	65,445
Kantishna Experience	Not Applicable	Not Applicable	Not Applicable	3,667	3,316	3,776
Lodges (overnight lodge visitors, lodge employees, and support vehicles)	16,517	18,037	21,807	21,797	15,854	17,509
People Visiting Entrance Area Only	72,815	74,472	80,585	76,169	65,149	64,747
Visitors in Private Vehicles Past Savage[2]	1,626	2,053	1,888	1,744	1,700	4,028
Total Seasonal Recreation Visitors Using Park Road	365,699	374,414	404,812	382,589	323,754	327,967

Note: "Seasonal Recreation Visitors" includes only recreational visitors during the season plus shoulder season. It does not include nonrecreational road users, such as professional photographers, researchers, contractors, or administrative users.

[1] Methodological adjustments were made in 2010; these adjustments produced an increase in total recreation numbers of approximately 8% to 10%.

[2] Visitors in private vehicles past Savage includes Kantishna right-of-way permits, road lottery visitors, Teklanika River Campground campers, and visitors traveling on handicap permits. The Park Service began a new data collection method in 2010 and believes that this is a better reflection of visitors in private vehicles past Savage than in previous years.

Most visitors to the Park Road corridor area are prebooked into their method of exploring the park — either on a transit bus (also called the Visitor Transportation System (VTS)) bus or on a tour bus — the Denali Natural History Tour, the Tundra Wilderness Tour, or the Kantishna Experience. Most tour passengers are picked up by their bus at their hotel. Visitors who are not part of packaged tours join a bus at the Wilderness Access Center. Only Denali Natural History Tour visitors visit the Wilderness Access Center; however, visitors joining the Tundra Wilderness Tour or Kantishna Experience use the Wilderness Access Center only as a transportation hub. In comments received during the scoping phase of the transportation plan, visitors expressed interest in having shuttle buses or some type of community transportation system available to transport all visitors from their lodging to the park.

DENALI PARK ROAD USE

As table 7 indicates, Park Road use generally falls into one of several categories. The majority of Park Road visitors travel the road on either a transit (VTS) bus or a tour bus. Private vehicle use past the paved section of the road at mile 15 (Savage River Check Station) is limited to administrative traffic, access to private inholdings in the Kantishna area, and a limited number of permitted special use vehicles such as professional photographers and campers driving to Teklanika River Campground. Bus-riding visitors include transit (VTS) riders, camper bus riders, and bus tour visitors. Current bus tours available to visitors, as mentioned above, are the Tundra Wilderness Tour, the Denali Natural History Tour, and the Kantishna Experience. Some visitors using the Park Road remain in the entrance area only, visiting facilities such as the Denali Visitor Center, the Murie Science and Learning Center, or the multiple miles of developed, accessible trails in the entrance area.

The visitor's experience on the Park Road corridor is in part guided by park management direction, which sets visitor experience expectations for different areas in the park. In the 1996 *Entrance Area and Road Corridor Development Concept Plan* amendments to the general management plan, the road corridor was divided into several zones. The primary zones that guide visitor experience expectations in the road corridor are Wildlife Viewing Subzone 1, which extends from the Savage River Bridge to the Teklanika River Bridge; and Wildlife Viewing Subzone 2, which extends from the Teklanika River Bridge to the "Old Park" boundary west of Wonder Lake. The following excerpts from the general management plan describe these zones:

> **Wildlife Viewing Subzone 1** includes part of the gravel section of the Park Road on which the primary purposes include wildlife and scenery viewing. Visitors travel on one of the bus systems and private vehicles are restricted. The only facilities present include the Park Road and generally one rest area for every hour of travel. Visitors can expect a greater level of traffic in this subzone than in Wildlife Viewing Subzone 2.
>
> **Wildlife Viewing Subzone 2** includes the gravel section of the Park Road on which vehicle restrictions (Rules of the Road) apply. Buses are given the right-of-way and the primary purposes include wildlife and scenery viewing. Visitors must use one of the bus systems; private vehicles are restricted. The only facilities include the Park Road, one or two visitor contact stations, and generally one rest area for every hour of travel. Visitors can expect a lower level of traffic than in Wildlife Viewing Subzone 1 (NPS 1986, 1997).

To further understand the visitor experience on the Park Road, the Park Service undertook a visitor survey specific to the Park Road experience as part of an overall study of road capacity (Manning and Hallo 2009, 2010).

This visitor experience component of the road study provides important foundational information for the road planning effort. In 2006 and 2007, researchers from the University of Vermont administered a series of qualitative and quantitative social science surveys aimed at better understanding what is important to visitors in making their Park Road experience a positive one.

The results of the studies shed light on visitors' experiences and preferences regarding elements such as wildlife sightings, crowding at rest areas, and encounters with other vehicles.

The experience of a visitor on the Park Road is unique in Alaska, as well as in the national park system. The true meaning of that experience is in making an awe-inspiring landscape accessible to a wide range of people. To travel the Denali Park Road is to be able to get on a bus at age 8 or 80, and, with cooperative weather, experience the thrill and majesty of Mount McKinley rising up out of the clouds. The visitor's experience is also defined by traveling up to 92 miles each way on a narrow, primitive road winding through mountain valleys, and to have the possibility of seeing a grizzly bear cross the road around the next bend, or watch caribou moving through a nearby river valley.

Viewing wildlife from the Park Road is an important part of the overall Denali experience; part of the allure of the Park Road trip is that most visitors are able to see compelling wildlife species. For example, a 2006 study found a majority of respondents saw grizzlies (82%), Dall sheep (81%), and caribou (87%) on their trip. Park data indicate the likelihood of seeing caribou, Dall sheep, or grizzlies has averaged more than 70% over the last 10 years, while the chance of seeing wolves or moose has averaged between 10% and 50% over the last 10 years. Visitors, however, have also reported that, while they typically see one of the "big five" wildlife species on their visit, 59% are disappointed in not seeing that wildlife at close range (UVM 2009).

Following is a brief description of various components of the current Park Road visitor's experience, organized by different categories of use.

Visitor Use of Courtesy Shuttle Buses

As the majority of Denali's visitors arrive in the area without a private vehicle, courtesy shuttle buses provide an important visitor service, particularly to the independent visitor. Several types of courtesy buses are available to visitors in the entrance area. One is the Riley Creek Loop Shuttle. Visitors wishing to explore the entrance area can use this courtesy shuttle to travel around the various visitor facilities, such as the Denali Visitor Center and the Murie Science and Learning Center. In addition, a shuttle service is also provided to the Savage River area at mile 15. This courtesy shuttle serves visitors who do not have time to travel farther on the Park Road, and who do not have a private vehicle at the park or who would prefer to park their vehicle and take a bus. A Sled Dog Demonstration courtesy shuttle is also available to visitors. This courtesy shuttle starts at the Denali Visitor Center and goes to the sled dog kennels, at mile 3. As there is limited parking at the kennels, the courtesy shuttle is the primary alternative to walking for visitors interested in the sled dog demonstration.

Visitor Use of Visitor Transportation System Bus

Visitors who experience the park via the transit system, also called the Visitor Transportation System (VTS), comprised approximately 20% of the total number of visitors to Denali in 2009. This system is run by the park concessioner, and essentially moves people around the park, allowing visitors to get on and off buses at their own pace to explore areas along the Park Road.

The primary intention of the system is to provide economical access to all areas of the Park Road for the independent traveler.

Transit (VTS) tickets are destination based, and can be purchased in advance or at the Wilderness Access Center. From the Wilderness Access Center, transit riders board a bus bound for one of four points along the 92-mile Park Road – Toklat River, Eielson Visitor Center, Wonder Lake, or Kantishna. The most common destination for transit riders is the Eielson Visitor Center, at mile 66. Other visitors choose a transit bus to day hike.

Once aboard the bus, food and beverages are not available, so transit users must provide their own. In addition, transit drivers do not provide interpretation during the drive, so the transit experience is more self-directed than that of the tour buses. Drivers will, however, provide safety and other basic information, as well as answer questions and stop for wildlife along the route.

These elements of the transit bus system combine to make the typical transit trip best suited for the visitor seeking a more independent, self-directed park experience – those who want to hike, those who want the freedom of spending time off a bus, or those seeking a more minimal on-bus interpretive experience. Several recent visitor studies support this portrait of the transit visitor (Manning et al. 2010). A recent visitor study asked transit bus riders and tour bus riders if they would have liked to get off the bus to hike that day. Fifty-nine percent (59%) of transit riders answered yes, compared to 44% of tour bus riders (Manning et al. 2010). Additional studies have indicated the majority of visitors taking a transit bus did so because they wanted to participate in an activity such as hiking or camping (UVM 2009)[1]. Furthermore, recent study data indicate fewer transit visitors think that "Most bus trips would include a stop at the park visitor center" is a good idea than Tour Bus visitors,[2] indicating the typical transit passenger may be seeking a more minimal interpretive experience.

Currently, visitors generally do not find transit buses to be crowded; a majority of survey respondents stated that they did not sense crowding on their transit bus. What transit riders have identified as a concern is being assured a seat on a bus if they choose to get off (NPS Summary of Scoping Comments). Transit riders do not have to stay on the bus in which they originally started their trip; they can flag down any other shuttle bus going in their desired direction and reboard on a seat-available basis. However, visitors are warned to be prepared to wait up to an hour for a bus with available seating. According to comment cards collected by park staff, wait times of more than an hour result in frustration and a less than desirable park experience.

While the system provides visitors with a degree of freedom and flexibility to explore beyond the confines of a tour schedule, visitors have indicated they would like a greater degree of flexibility. People might not feel as free to get off the bus and explore if they do not feel confident they could get back on and get "home" in a timely manner.

Visitor Use of Tour Buses

In addition to the transit buses, visitors can choose to take a tour bus on the Park Road. As are all drivers, including transit drivers, bus tour drivers are employed by the park's primary concessioner, Doyon/ARAMARK

[1] Respondents who chose a VTS bus answered why they chose VTS. The most common response to the question was "They had to because of the activity they wanted to participate in (e.g., hiking or camping)."

[2] Manning et al. 2010 study results. Mean VTS score 0.28, mean Tour score .92 (1.0 = stopping for interpretation a good idea).

Joint Venture[1] (Joint Venture). These drivers provide the formal interpretation on the bus trips (although on the Kantishna Experience, an NPS ranger also boards the tour bus at Wonder Lake). More information about the interpretive experience that visitors receive on these tours is provided in the following section. Reservations for tour buses are generally made in advance, although walk-in reservations are available at the Wilderness Access Center. Visitors traveling on tour buses are more likely than transit riders to find their buses crowded, although the majority surveyed still find that too many people on buses is not a problem. One challenge currently facing the park is the pressure on tour capacities posed by large package operators. These operators have the ability to fill buses to capacity and potentially edge out independent visitors (NPS 2009b). Finding and maintaining the right balance is a challenge that will be key to future visitors' tour bus experience.

Denali Natural History Tour. The Denali Natural History Tour is a 4.5-hour tour that begins at the Wilderness Access Center and turns around at mile 17 (Primrose Ridge). Approximately 22% of Denali visitors experience the park through the Denali Natural History Tour. This tour focuses on the park's rich natural and cultural heritage. During the tour, drivers take visitors to several interpretive stops to enhance the experience. When they arrive at the Wilderness Access Center, they view the film "Across Time and Tundra," which depicts early visitor experiences in the same area they are about to travel through. After boarding the bus, Denali Natural History Tour travelers are then driven approximately 13 miles to the Savage Cabin, where they receive a living-history glimpse of past cabin use. Visitors then reboard their bus and travel a few more miles to the Primrose Ridge turnaround point. There they experience an Alaskan Native presentation interpreting the history of native land use in the area. On the Denali Natural History Tour, a snack and hot beverages are provided, but not lunch.

Tundra Wilderness Tour. Approximately one-third of all Denali visitors experience the park through the Tundra Wilderness Tour. The focus of this tour is to provide in-depth information about the history of the park, while watching for wildlife and other photography opportunities. Variations of this tour have been offered at Denali since 1923. Visitors who have booked the Tundra Wilderness Tour are typically picked up at their hotel, although the tour makes a stop at the Wilderness Access Center to pick up independent travelers. Visitors would then spend seven or eight hours on their excursion into the park. Visitors on this tour are provided a lunch. Tour leaders are the Joint Venture bus drivers. The Tundra Wilderness Tour typically travels to the Stony Overlook (mile 62) if the weather is favorable for mountain viewing. Along the way, drivers periodically stop at rest areas and along the road where wildlife is visible. In addition, Tundra Wilderness Tour buses are equipped with video cameras and monitors that drivers use to zoom in on distant wildlife and display to passengers. Sales of DVDs from the bus cameras are then available for visitor purchase.

Kantishna Experience. In 2007, the park began offering the Kantishna Experience. This tour, the longest available, picks up visitors at their hotels, although independent travelers can board at the Wilderness Access Center. The Kantishna Experience takes visitors on an

[1] Doyon Limited is a native regional corporation authorized by Congress in 1971 as part of the Alaska Native Claims Settlement Act (ANCSA). Doyon is the largest private landowner in Alaska and one of the state's 10 largest Alaska-owned companies. Its mission includes promoting the economic and social well-being of its current and future native shareholders, to strengthen the native way of life, and protect and enhance its land and resources (http://www.doyon.com). Aramark is a global professional services company, providing food services, facilities management, and uniform and career apparel to health care institutions, universities and school districts, stadiums and arenas, and businesses around the world (http://www.aramark.com/default.aspx).

11- to 12-hour trip to Kantishna. Nearly 7,000 visitors have taken the Kantishna Experience since its inception. The emphasis of this tour is to provide visitors with a tour that takes them to the end of the road, while learning about the historic gold mining district of Kantishna. In addition to the interpretation provided by the Joint Venture drivers along the 92-mile route, the Kantishna Experience is the only tour providing NPS interpretation. NPS rangers join the tour at the Wonder Lake Ranger Station, and provide an immersive interpretive experience in the historic mining district. During their daylong bus trip, visitors are provided with a lunch, snack, and beverages.

Visitors' Interpretive Experience

On-Vehicle Interpretive Facilities. The visitor's experience while traveling on the Park Road is significantly influenced by the on-bus interpretation they receive. Whether the visitor boards a transit bus or a tour bus, a majority of their experience in the park is on that vehicle. Consequently, the educational and interpretive experience they receive on that bus is a significant component in their overall park experience. The level of on-bus interpretation varies between transportation types – tour bus drivers provide interpretation to visitors, while transit bus drivers do not. All drivers are employees of Joint Venture, who has held the concession contract for transportation services at Denali since 2003. The mean experience level for Joint Venture drivers is 12 years. Seventeen percent of Joint Venture drivers have 20+ years of experience as drivers and guides in the park. Joint Venture maintains an interpretive training program that includes training for transit and tour drivers, interpretive coaching staff, and a resource library. While this interpretive system has benefits, it also presents challenges to ensure the delivery of desired park messages through a commercial operator (Denali Education Plan 2009).

Transit bus drivers provide limited narration, rather than interpretive services. Drivers of transit buses are not required to provide full narration. Visitors have their questions answered by drivers, but do not typically receive a narrated ride, unless a particular driver chooses to provide one.

Visitors on tour buses receive a full interpretive experience. The Denali Natural History Tour, the Tundra Wilderness Tour, and the Kantishna Experience are conducted by certified driver-naturalists who provide a guided informative trip for visitors. The type of interpretation provided varies across tours. On the Denali Natural History Tour, the focus is the tour's theme of Denali's natural and cultural history. Interpretation on the Tundra Wilderness Tour typically includes Denali history, anecdotes, and education about park wildlife. Use of the video screen also enhances some visitors' interpretive experience on this tour by providing them a closer view of wildlife than they would otherwise be able to see. It should be acknowledged, however, that viewing wildlife on a screen is a different experience than viewing wildlife directly. Interpretation on the Kantishna Experience includes park history as well as a glimpse of the history of the Kantishna Mining District. As mentioned above, the interpretive experience of Kantishna Experience visitors is enhanced by this being the only tour where NPS rangers join the bus.

Park Road Interpretive Services. Interpretation off the buses is provided by both NPS and concessioner staff. Joint Venture provides living history interpretive programming at Savage Cabin as well as Native Alaskan history at the Primrose Overlook as part of the Denali Natural History Tour. Joint Venture also provides exhibits and displays at the Wilderness Access Center and interpretive outreach programming in the area hotels. Interpretive services provided by NPS staff include the following:

Visitor Center Facilities. Visitors have opportunities for contact with NPS staff at both the Denali Visitor Center and the Eielson Visitor Center. The Denali Visitor Center, although centrally located at the park entrance, is estimated to currently receive only 50% of all Denali visitors (NPS 2009b). This facility is intended to be the primary provider of visitor information services in the entrance area, as the Wilderness Access Center is intended as a transportation hub. These distinctive roles are likely not distinguished clearly enough for visitors. The Toklat Rest Stop has a visitor contact station that serves the majority of tour passengers. The Eielson Visitor Center also has ranger-provided visitor information services. This facility, however, is only accessed by the percentage of park visitors who reach Eielson by a transit bus or on the Kantishna Experience bus. Buses going to the private lodges in Kantishna also stop at Eielson.

Campground Interpretive Talks. Evening educational campground programs are presented by NPS rangers at the Riley Creek, Savage River, Teklanika River, and Wonder Lake campgrounds. This service provides visitors the opportunity to learn about anything from glaciers to grizzlies in a 30- to 45-minute program. The frequency of this interpretive programming has varied due to budgetary constraints.

Backcountry Discovery Hikes and Ranger-led Walks. As described below in the "Accessing Wilderness" section, the Park Road provides an important route into Denali's wild landscape. Visitors wishing to travel into the backcountry on an off-trail day hike guided by NPS staff can sign up for a discovery hike at the Denali Visitor Center. Discovery hikes are limited to 11 visitors per hike. Participants in this activity leave on a bus at 8:00 a.m. from the Wilderness Access Center, and are led by experienced NPS rangers anywhere in the trailless backcountry. One to two hikes are offered daily, depending on budget and staffing. The hikes can be strenuous or moderate. Visitors have expressed interest in increased interaction with NPS rangers through expansion or improved marketing of the discovery hike opportunities, or by otherwise stationing NPS rangers along the road.

For less strenuous guided walks, NPS staff provides trail-based guided hikes on trails around the two visitor centers. A morning and afternoon hike starting at the Denali Visitor Center are typically offered each day. A daily afternoon hike is usually offered at the Eielson Visitor Center, which visitors can access by taking the transit bus.

Visitor Access

Understanding the visitor's ability to access a variety of features via the Park Road is an important part of understanding the current visitor experience at Denali. Through a trip on the Park Road, visitors have access to a variety of different experiences and facilities, including remote backcountry wilderness adventures, developed recreational vehicle (RV) and tent campgrounds, visitor centers, and rest areas.

Currently, one basic element of visitor access is the limit on vehicles in the road corridor imposed by the 1986 general management plan. In 1986, a use limit of 10,512 annual seasonal vehicle trips was imposed on the road corridor, which applies to the native gravel surface sections of the road past the Savage River Check Station. Managing to this vehicle limit influences the types and frequency of shuttle and tour bus offerings available to visitors.

Another component of visitor access is the potential for crowding on the Park Road, which can affect visitors' ability to obtain quality access to the natural and cultural features they have come to see. Crowding on the road can be manifested in several ways, including the number of vehicles at parking areas or rest areas, or the number of vehicles stopped on the road at a "wildlife stop." Fifty-

five percent of respondents recently mentioned "Too many buses on the Denali Park Road" as either a small (45%) or big (10%) problem. The issue of potential crowding at rest areas is discussed further below. The issue of potential crowding at wildlife stops and in viewsheds is also a concern. The issue of "Other buses blocking views" was considered a problem by 35% of visitors (UVM 2009). "Too many buses at wildlife stops" was considered a problem by 43% of visitors. As wildlife viewing and scenic vistas are vital parts of a high-quality visitor experience at Denali, managing vehicle crowding to maintain those views is essential.

Cost of Access. An additional factor in visitors' ability to access the Denali Park Road is the cost to the visitor. Currently there are several components of the affordability of a park experience. Entrance fees, costs of bus tickets, and other costs — including those associated with food and beverages — contribute to the affordability of the visitor's park experience. Table 8 displays the fees associated with experiencing the Park Road area.

A family of four coming to Denali for a day and taking the Denali Natural History Tour, for example, would pay $202.50 for the experience. Studies show that 41% of visitors are in groups of two; as a sample trip, the cost for two adults to enter the park, take the transit camper bus to the Wonder Lake campground, and tent camp for the night would be $103.90. These are just a few examples of the current affordability of the park experience for different types of visitors.

Accessing Wilderness. Many of the visitors using the Park Road are using it to access the vast tracts of wildlands that comprise the majority of the land base in Denali National Park. Although some visitors to Denali, including mountain climbers and backpackers, access the wilderness via the southern areas of the park, others use the transit bus as a way to get into the Denali backcountry. Wilderness permits are required for overnight travel in the old park section of Denali. Denali's vast tracts of wildlands with virtually no trails offer adventurous visitors unique opportunities for a self-sufficient wilderness experience. Backcountry use off the Park Road can be considered in two categories – day hiking and overnight backpack trips. Little data are currently available on the extent of day hiking in the park. Day hikers often use a transit bus to get into the backcountry; they either start their hike from a chosen spot along the Park Road or use a transit bus to get to their starting point and hike into the backcountry from there.

Visitors traveling into the Denali wilderness for an overnight trip must obtain a backcountry camping permit from the Backcountry Information Center. As backcountry permit data in table 9 show, some overnight wilderness visitors then travel the Park Road to access their backcountry unit. These backcountry permit data suggest approximately 65% of Denali's overnight wilderness visitors are using backcountry units accessed from the Park Road. (The majority of backcountry user nights, however, take place on Mount McKinley and the south side of the park, reflecting the longer visits necessary for mountaineering.)

A significant number of Denali backpacking visitors visit the "Old Park," and use the camper bus service to be dropped off and picked up along the Park Road corridor. One important role of the transit system, therefore, is to provide access into wilderness for many Denali backcountry visitors.

Due to this heavy reliance on the Park Road, and, more specifically, the Visitor Transportation System, for accessing the Denali backcountry, the schedule, accessibility, and general ease of use of the system is an important component of backcountry access in Denali.

Table 8. 2010 Denali Park Road Fees

Type of Fee	Amount of Fee
Entrance Fee[1]	$10/person (children 15 years and younger free, exceptions for Denali Pass and America the Beautiful Pass holders)
Bus Fees[2]	
Visitor Transportation System Bus Ticket	$24–$46/adult ($31.45 camper), $12–$23/teens, under 14 free; rates are dependent on destination
Denali Natural History Tour Ticket	$60.75/adult, $30.50 children 14 and under
Tundra Wilderness Tour Ticket	$67.00–$103/adult, $33.50–$51.50 children 14 and under; rates are dependent on destination
Kantishna Experience Ticket	$155/adult, $77.50 children 14 and under
Campground Fees[3]	$9–$40[4], dependent on campground and type and size of site

[1] Majority of fee collected by concessioner, Joint Venture.
[2] Fee collected by concessioner, Joint Venture.
[3] Fee collected by concessioner, Joint Venture.
[4] $40 is for a group campsite.

Table 9. Backcountry Visitors to Denali

Backcountry Destination	Number of Visitors					
	2005	2006	2007	2008	2009	2010
Mount McKinley	1,298	1,107	1,218	1,272	1,161	1,222
Mount Foraker	32	24	21	16	15	9
Other Mountaineering	519	553	486	638	576	608
Backcountry-North Side[1]	3,861	3,411	3,396	2,790	3,080	3,673
Total Backcountry and Mountaineering	5,710	5,095	5,121	5,716	4,832	5,512

Source: Monthly Public Use Report 2010.
[1] Backcountry reflects users who obtained permits at the Backcountry Information Center for overnight backcountry use via the north side, primarily in the Denali Wilderness and Kantishna.

Accessing Park Features. *Visitor Facilities* — Visitors have access to two visitor facilities along the restricted section of the Park Road. At mile 53, there is a visitor contact station at Toklat River. The Toklat River contact station is a fabric-walled structure that offers park information and a bookstore, which is operated by Alaska Geographic. This contact station is accessible to visitors via the transit buses, the Tundra Wilderness Tour and Kantishna Experience buses, and lodge buses.

The primary visitor center other than the entrance area facilities is the Eielson Visitor Center at mile 66. The facility, which opened in 2008, is home to a variety of interpretive displays, and is the base for both indoor and outdoor ranger-led programs. The Eielson Visitor Center is accessed via the transit system as well as the Kantishna Experience bus, and by the private Kantishna lodge buses. The Eielson Visitor Center provides many "off-bus" opportunities for visitors, including guided hiking opportunities and some developed trails that visitors can explore on their own. As the majority of the Denali landscape is trailless, these developed trail and guided hiking opportunities are a valuable resource for many visitors.

Rest Areas — In addition to visitor centers, the Park Road provides access to various different rest areas. Rest areas are an important component of the visitor experience for

several reasons. Not only do rest stops provide an opportunity to use a restroom facility and get off the bus, they also are strategically located at key vistas, providing visitors with quintessential Denali viewing opportunities. In addition, rest stops allow bus passengers to interact with each other, enhancing their experience.

In addition to the facilities provided at the Eielson Visitor Center, rest areas are provide at various places along the Park Road, including at Mountain Vista, Savage, Primrose Ridge, Teklanika, Toklat, and Wonder Lake. The Stony Overlook is also a place for buses to stop, albeit one without facilities. Since all buses use rest areas, there is the potential for less than desirable visitor access and experience at these areas. Multiple buses can and do stop at one rest area at the same time. This has the potential to negatively impact the visitor experience by creating pulses of activity during which access to facilities and viewsheds can be impacted, and the visitor's general sense of crowding can increase. Multiple buses at rest areas can present management challenges.

In a qualitative study conducted in 2006 (UVM 2009), however, researchers found a high degree of visitor satisfaction with the current access to rest areas on the Park Road. In an analysis of visitor-perceived problems on the Park Road, "lack of visitor facilities" was among the least problematic issues for Denali visitors. The same study also analyzed visitors' perception of crowding at those rest areas. Respondents found crowding at rest facilities to be only slightly more problematic for them than the supply of those facilities. The average visitor surveyed rated "Too many buses at rest stops" at 1.4 on a scale of 1 to 3, with 1 meaning "not a problem" and 3 meaning "a big problem."

Campgrounds and Day Use Areas. There are six designated campgrounds in the park. All six of these are accessible from the Park Road; accessing Denali's campgrounds is a component of visitor use of the road. The campgrounds are described below.

Riley Creek — The Riley Creek campground is just inside the Park Road entrance. Use of this tent and RV campground, the largest in the park at 147 sites, does not impact a significant portion of Park Road use.

Savage River — The Savage River campground is at mile 13 on the Park Road and has 33 sites. It is accessible by private vehicles or by transit bus. Also available in the Savage River area are group campsites, as well as two day use areas with picnic tables and facilities, at mile 15. The Savage River trail runs through the area, following the Savage River downstream, crossing the river on a footbridge, and returning by the river to the other day use area. The Mountain Vista trailhead is also accessible in the Savage River vicinity, providing additional hiking opportunities. This collection of visitor amenities, along with the area's accessibility, makes the Savage River area a popular destination for visitors.

Sanctuary River — The Sanctuary River campground is at mile 22 on the Park Road and has seven sites. Visitors camping at this primitive tents-only campground use a camper bus to reach their site.

Teklanika River — The Teklanika River Campground is at mile 29 on the Park Road and has 53 sites. As it is an exception to the "no private vehicles past Savage" restriction, visitors wishing to camp at Teklanika have the option of accessing this campground with their own vehicle; however, they must reserve the site for a minimum of three nights. Other visitors to the Teklanika River Campground use camper buses for access.

Igloo Creek — The Igloo Creek campground is at mile 35 on the Park Road and has seven sites. Visitors camping at this primitive tents-only campground use a camper bus to reach their campsite. Igloo Creek was closed between 2001 and 2007 and reopened in 2008.

Wonder Lake — The Wonder Lake campground is at mile 85 on the Park Road and has 28 sites. This campground requires the longest access trip of any of Denali's developed campgrounds. Visitors wishing to camp at this tents-only campground board a camper bus and travel nearly the length of the Park Road to access their campsite.

Although accessing campgrounds does not comprise a significant proportion of Park Road use, visitors' ability to access Denali's six developed campgrounds remains a consideration in Park Road planning.

Table 10 includes campground visitation figures for the years 2005 to 2010.

Table 10. Campground Visitation, 2005–2010, in Number of Overnight Stays

Campground	2005	2006	2007	2008	2009	2010
Riley Creek	48,647	40,267	44,620	33,744	30,054	35,062
Savage River[1]	14,011	9,444	14,186	12,064	10,619	11,374
Sanctuary River	929	732	988	502	257	327
Teklanika River	14,810	14,629	15,966	9,740	13,555	14,662
Igloo River[2]	NA	NA	NA	752	645	1,003
Wonder Lake	6,165	6,062	6,637	5,441	4,846	5,055

[1] Includes Savage River group site.
[2] Data for Igloo Creek campground is unavailable from 2005 through 2007 as the campground was closed temporarily from 2001 through 2007.

Trails. Approximately 27 miles of trails are accessible from the Park Road in Denali. Table 11 displays existing maintained trails in the park.

As table 11 indicates, the majority of the maintained trails in Denali are located in or accessible from the entrance area, and do not require use of the park transportation system. While the Park Road and the Visitor Transportation System provide access to designated hiking trails in the park, this use is not currently a large proportion of Park Road use. As the majority of the park is either trailless backcountry or a road corridor, these relatively scarce trail resources are an important part of providing visitors a diverse spectrum of recreational opportunities.

Table 11. Existing Maintained Trails

Trail Name	Length in Miles	Surface Type	Location/Access From
Horseshoe Lake	0.8	Crushed stone	Entrance Area
Jonesville	0.4	Crushed stone	Entrance Area
Mount Healy Overlook	2.2	Native material	Entrance Area
Roadside	2.2	Crushed stone	Entrance Area
Rock Creek	2.4	Crushed stone	Entrance Area
Taiga	1.5	Native material	Entrance Area
Triple Lakes	7.6	Native material	Entrance Area
Spring Dog/Ski Trail[1]	4.3	Native material	Entrance Area (kennels)
Primrose	0.2	Crushed stone	Primrose
Savage Cabin	0.3	Crushed stone	Savage
Savage River	1.7	Native material	Savage
Savage River Bar	0.2	Native material	Savage
Polychrome	0.5	Native material	Polychrome Overlook (mile 47)
McKinley Bar	2.2	Native material	Wonder Lake
Blueberry Hill	0.2	Native material	Wonder Lake
Alpine Trail	1.0	Native material	Eielson Visitor Center
Eielson Tundra Loop	0.4	Crushed stone	Eielson Visitor Center
Eielson Tundra Spur	0.2	Crushed stone	Eielson Visitor Center
Gorge Creek	0.2	Native material	Eielson Visitor Center
TOTAL MILES:	28.5		

[1] Trail is unimproved and is available for use only during snow cover.

Visitor Safety and Comfort

Components of the visitor experience related to safety and comfort are important parts of the overall visitor experience at Denali. Some of the more significant issues related to visitor safety and comfort at Denali are 1) safety of road travel, 2) comfort of bus seats and the ride itself, and 3) dust generated by buses. The safety of visitors traveling the road is largely addressed through the implementation of the park's "Rules of the Road." These safety procedures cover issues such as rights-of-way and vehicle yielding procedures. In general, these policies provide protocols for meeting and passing vehicles on the Park Road, which is a primary safety concern given the narrow nature of the majority of the historic road (NPS 2007). Other visitor safety issues on the Park Road are generated by the road's historic character and are addressed by park management. For example, the narrow, winding, restricted section of the road could have problems with sight distance and adequate road width for passing vehicles if not addressed. The road could also have safety problems resulting from inadequate surface road friction if not addressed. Correcting road safety concerns is a top priority of the park's general management plan.

Studies show visitors do not perceive safety to be a significant issue on the Park Road (UVM 2009). One exception to this, however, is perceived danger associated with Polychrome Pass. Some visitors traveling through Polychrome Pass have safety concerns due to the steep drop-offs and narrow, curving

nature of the road in that location (UVM 2009). While the park management addresses this potential safety concern with a system of driver spacing and wait times, visitors appear to be unaware of this management policy and perceive a safety issue there.

Visitor comfort is influenced by two primary factors – dust generated by road traffic on an unpaved road and the comfort of the bus. The park currently addresses dust generation in several ways, depending on the road section. These methods include water dispersal, distribution of calcium chloride, and imposing speed limits for construction vehicles in unpaved areas.

See *Environmental Assessment for Dust Abatement Activities on the Denali Park Road, 1999* for more information on management of Park Road dust issues. Dust generated by the road has been shown to be a factor that negatively influences the Park Road experience for some visitors. Qualitative studies have found some visitors comment that "Being on a gravel road [was] uncomfortable. There was lots of dust and dirt." (UVM 2009). Some road travelers also comment on the comfort and nature of the buses themselves. Visitor studies have shown the condition of the windows and the comfort of bus seats to be a concern for some visitors. Some survey respondents point out uncomfortable or cramped seating and windows that were dirty or did not function properly as "annoying" features of the bus, although when asked what factors influenced the quality of their visitor experience, most did not mention bus quality issues (UVM 2009). Similarly, a 2006 study found that while a majority of respondents rated the quality of transit and tour buses as "very good," the few respondents ranking transportation as "poor" or "very poor" did so partly for reasons related to an "uncomfortable bus ride" or "bus design" (NPS 2007).

Finally, the character of the Park Road itself and the road's relationship with the landscapes through which it passes are part of the visitor experience. The primitive character of the road is to be preserved for its historic, as well as esthetic, value. The Park Service maintains the road to provide for visitor safety and an adequate degree of visitor comfort while preserving the road's historic character.

Climate Change and Visitor Experience

Present and future landscape alterations due to climate change in the region are expected and could alter viewsheds and visitor experience at various points along the Park Road. For example, data indicate the warming Alaskan tundra is currently trending toward a brushier landscape that may succeed to taller vegetation, such as white spruce, on landscapes that are currently open viewsheds. This could decrease sightlines as visitors travel the Park Road, making it more difficult to see the open landscape and associated resources (e.g., wildlife) at long distances.

TRANSPORTATION SYSTEM AND TRAFFIC

In addition to the concessioner-operated buses, three businesses in Kantishna operate their own transportation services to bring visitors to their facilities for either day trips or overnight stays. Commercial traffic other than that associated with the park concessioner or the Kantishna businesses can travel no farther than the Alaska Railroad depot at mile 1.3 of the Park Road, with the exception of those using the group campsite at Savage River campground. Private vehicle traffic is allowed on the Park Road under specific circumstances, including employee access to duty stations and residences at Toklat, Wonder Lake, or Kantishna, as well as inholder access to Kantishna. Additionally, the Park Service uses vehicles for administrative purposes, and provides access to contractors working on park projects.

Each of these components of the transportation system is described in more detail below.

ENTERING THE PARK

Park visitors arrive at the park via railroad, on tour buses (that load passengers at lodging facilities outside the park with stops in the entrance area as needed), concessioner courtesy buses, or private vehicles. Short-term and long-term parking is provided for private vehicles at the Wilderness Access Center.

TRANSPORTATION SERVICES

Visitor Transportation System

The VTS buses provide basic transportation for park visitors in lieu of personal vehicle access. Operated by the park concessioner, these transit buses transport passengers on a regular schedule, which is adjusted prior to each new summer season to anticipate visitor demand. The majority of these passengers are not on package tours. A fee is charged for riding on these buses, and all buses start their journey at the Wilderness Access Center near the park entrance (see figure 2). While the purpose of the transit buses is to provide transportation and access for opportunities in the park, the buses stop to view wildlife and scenery.

The park's general management plan specifies no more than 36 roundtrip transit bus trips per day, with a maximum of 3,394 round-trips per allocation season. Approximately five buses per day are designated "camper" buses, which transport backpackers and visitors staying at the roadside campgrounds (Sanctuary River, Teklanika River, Igloo Creek, and Wonder Lake) and also pick up returning day hikers. Initial boarding for these buses takes place at the Wilderness Access Center and the Riley Creek campground, which is also near the park entrance and is accessible via shuttle service (see '"Entrance Area Shuttles" later in this section). Two camper buses remain at Wonder Lake overnight and travel back east the following morning.

VTS buses generally seat 36 to 48 passengers, depending on whether they are equipped with wheelchair lifts. The camper buses have seats removed in the back to accommodate backpacks, other camping gear, and bicycles, which reduces seating capacity to 28.

Tour Services

Three tours are offered in the park – the Tundra Wilderness Tour, the Denali Natural History Tour, and the Kantishna Experience. The majority of the passengers on Tundra Wilderness and Denali Natural History tours who are traveling as part of a cruise-land tour package are booked on one of these tours as part of their package. These tours board at

lodge properties in the Nenana Canyon or McKinley Village areas outside the park or at the park's Wilderness Access Center (see figure 2).

Tundra Wilderness Tour. Buses are assigned to this tour depending upon the demand each day. For that reason, the number of tours fluctuates day to day (in 2010, the number of Tundra Wilderness Tours at the Savage River Check Station fluctuated from a minimum of 8 to a maximum of 29 per day). However, Tundra Wilderness Tours generally depart in two clusters, one leaving in the early morning to allow a return in time for the afternoon train; the other leaves in the afternoon to carry passengers who arrived in Denali on the noon train. During the spring shoulder season or if the road is otherwise closed further west, the Tundra Wilderness Tour goes only to Teklanika Rest Stop at mile 29. The Tundra Wilderness Tour buses seat either 48 or 53 passengers, depending on whether they are equipped with a wheelchair lift.

Denali Natural History Tour. Buses are assigned to this tour depending upon the demand each day (in 2010, the number of Denali Natural History Tours at the Savage River Check Station ranged from 5 to 23 per day). The purpose of the Denali Natural History Tour is to interpret the cultural history of the area; wildlife viewing is not its primary focus, but the bus stops when wildlife is sighted and the driver provides information on the commonly viewed species. The Denali Natural History Tour buses seat either 44 or 52 passengers, depending on whether they are equipped with a wheelchair lift.

Kantishna Experience. This tour lasts 12 hours, and as a result, it is offered only once per day. Kantishna Experience buses seat 41 passengers and include refrigeration for lunches.

Current Guidance on Tour Services

As noted, the park's general management plan specifies no more than 30 Tundra Wilderness Tours per day and no more than 2,089 during the allocation season. In addition, the plan specifies 400 to 550 "annual" buses, replacing a former higher quota of professional photographer permits, which can be allocated to either the VTS or Tundra Wilderness Tours. In recent years these permits have generally been allocated mostly to the Tundra Wilderness Tour system, with some used for the Murie Science and Learning Center.

The Denali Natural History Tour is not subject to the seasonal allocation limit since the buses only travel 2 miles past the Savage River Check Station. However, the general management plan and successive agreements limit the Denali Natural History Tour to no more than 23 buses per day. The Kantishna Experience is a new service initiated in 2007, and has no specific guidance in the general management plan. However, it is counted as a transit bus for the purpose of allocation limits (HDR Alaska Inc. (HDR) 2009).

Kantishna Lodges

Kantishna lodge buses are operated independently by each of the three privately owned businesses at the end of the Park Road in Kantishna—Camp Denali/North Face Lodge, Denali Backcountry Lodge, and Kantishna Roadhouse—to transport guests to their facilities for overnight stays or day trips. These buses stop at the rest stops and the Eielson Visitor Center en route to their destination (see figure 2). Kantishna lodge buses transporting overnight guests are usually timed to meet the noon trains for drop off and pick up. Because Camp Denali/North Face Lodge requires a three-night minimum stay, this lodge uses the road to the east end only twice per week.

Kantishna Roadhouse and Denali Backcountry Lodge day trip buses depart early

(7:00 a.m. or earlier) to complete their lengthy journeys into the park. The lodges also use smaller vehicles to transport visitors to hikes and interpretive opportunities throughout the Kantishna area north of the former Mount McKinley National Park (Old Park) boundary—where NPS road restrictions do not apply—and, in a more limited fashion, along the restricted portion of the road within the Old Park. Travel into the Old Park for hiking is governed by stipulations in the lodges' concession permits.

A fourth business, Kantishna Air Taxi/Skyline Lodge, has a small number of rooms for overnight accommodations, and offers "flightseeing" services that include fly/drive packages, in addition to offering flightseeing services to all Kantishna lodge guests. These packages involve a one-way trip using either the transit shuttle or Kantishna Lodge buses joined to a one-way air taxi flight. Kantishna Air Taxi/Skyline Lodge does not generally use its own vehicle permits to transport guests along the Park Road.

Kantishna business traffic is included within the general management plan limit of 1,360 vehicles per allocation season. The season is shorter in Kantishna since the road is not typically ready for traffic until the first or second week in June. Denali Backcountry Lodge and Camp Denali/North Face have 315 permits each for the season and the Kantishna Roadhouse is allocated 420 permits. These allocations include any nonbus service or employee vehicles going to the lodges. Separate limitations apply to vehicles reentering the Old Park from Kantishna for day hiking, which presently are not counted against the road capacity limit (HDR 2009).

Entrance Area Shuttles

In addition to the tour buses and the buses that provide a variety of transportation services along the Park Road west of Savage River, a variety transportation options are available for visitors moving around the park entrance area east of Savage River and to the communities outside of the park. This portion of the Park Road is open to all vehicle traffic; however, commercial vehicles may travel no further than the Alaska Railroad depot at mile 1.3 (the exception is the use of commercial vehicles to transport employees). All entrance area shuttles and courtesy transportation services are offered free of charge. No policy limits on vehicle traffic are associated with these shuttles as all operate outside of the restricted area of the Park Road. See figure 2 for details on entrance area destinations.

The **Savage River Shuttle** is a park concession-operated service that transports visitors from the park entrance to the Savage River (mile 15). All Savage shuttles stop at the Denali Visitor Center/Train Depot, park headquarters (mile 3), Murie Science and Learning Center, Mountain Vista trailhead (mile 12.5), Savage River campground (mile 13), and the Savage River parking lot. This shuttle operates on a fixed schedule and runs continuous loops from the visitor center once each hour.

The **Dog Sled Demonstration Shuttle** is a park concession-operated service that transports visitors to the sled dog demonstrations presented daily at the park kennels in the Headquarters Historic District. The shuttle departs from the Denali Visitor Center. In the peak season, the Dog Sled Demonstration Shuttle departs three times daily, 30 minutes before each dog sled demonstration. Buses remain at the Headquarters Historic District until the conclusion of the demonstration to transport visitors back to the visitor center area.

The **Riley Creek Loop Shuttle** is a park concession-operated service that begins at Riley Creek campground and includes stops at park headquarters, Murie Science and Learning Center, Denali Visitor Center/Train Depot, Wilderness Access Center, and Horseshoe Lake trailhead. This shuttle operates on a fixed schedule and runs

continuous loops from the visitor center once each half hour.

Lastly, **courtesy vans and buses** operated by local businesses transport visitors from their establishments in the surrounding area to the park. These buses and vans stop at the Wilderness Access Center and the Denali Visitor Center/Train Depot. They are not regulated by the Park Service; however, the Park Service has designated a dropoff area at the visitor center for these buses and vans. The courtesy vans and buses are all operated by different hotel and tour companies. Some operate on a fixed, posted schedule while others provide service on demand.

Private Vehicles

Private vehicles may be driven without a permit as far as the Savage River Check Station, located at the Savage River Bridge at approximately mile 15 of the Park Road (figure 2); the check station marks the beginning of the restricted portion of the Park Road. This is the point at which vehicles are counted toward the vehicle capacity limit (see chapter 1). Unrestricted travel is also possible on the road in Kantishna, north of the boundary of Old Park, but vehicles must have a pass through the restricted portion of the road to reach Kantishna.

The private vehicle traffic allowed on the restricted portion of the Park Road is broken down into the following categories:

- Campers at Teklanika River Campground. Campers are allowed to drive only once into the campground and once out, with a minimum three-night stay; their vehicle must remain parked at the campground during their stay; vehicles traveling to Teklanika River Campground are limited only by the number of campsite permits available and the requisite three-night minimum stay.
- Owners of private land in the Kantishna area. Each private landholder in Kantishna is given a set number of entries each year. Collectively there is a limit of 1,360 vehicles going to Kantishna, including lodge and all other traffic.
- Professional photographers and film crews. Permits for these users are limited to five per day, with more photographers than film crews (HDR 2009). Two individuals are allowed in one vehicle with a permit, and permits are good for up to nine days.
- Qualified subsistence hunters who use the Park Road to access Kantishna during the fall hunting season. There are no limits on hunter vehicle passes, but the population of hunters interested in hunting in Kantishna is limited and few road permits are given out annually (HDR 2009).
- People with disabilities who are unable to use the buses, including those with wheelchair lifts.
- Staff participating in Murie Science and Learning Center programs.
- Private and school researchers.
- Others (state troopers, wreckers, and guests of employees living in the park).

NPS, Concession, Partner, and Contractor Vehicles

The Park Service uses government vehicles along the road for managing the park. Vehicle uses include ranger patrols, employee travel to duty stations or interpretive programs, research and resource management activities, building and road maintenance, and contractor oversight, among others. Employees and volunteers who reside in government housing at Toklat, Wonder Lake, or Kantishna also obtain limited road travel

permits to reach their residences. In addition, the Park Service hires contractors to perform various tasks on its behalf, particularly road and facility construction. Contractors require access to the Park Road and are provided permits.

Similarly, the park concessioner requires some vehicle use past Savage to staff and maintain the Primrose pullout, turnaround point for the Denali Natural History Tour. The Murie Science and Learning Center, jointly operated by the Park Service and nonprofit education partners, has road permits to transport its staff and program participants to activities along the Park Road and to its field camp at Teklanika River Campground.

The 1986 general management plan limits the Park Service to 1,754 vehicle trips per allocation season. Contractor vehicles have not been counted toward this limit. The number of contractor vehicles varies widely from year-to-year depending on the number and type of contracted projects. The Murie Science and Learning Center has up to 150 buses that have been allocated to it from the "annual bus" category (HDR 2009).

In addition, bus trips used for training drivers do not count against bus limits, but do count against seasonal limits if used within the allocation season (i.e., the Saturday of Memorial Day weekend through the second Thursday following Labor Day or September 15, whichever comes first).

WILDLIFE AND WILDLIFE HABITAT

As described in chapter 1, wildlife and wildlife habitat issues have been identified for five individual species (Dall sheep, grizzly bear, caribou, moose, and gray wolf) because of their relationship to the park's purpose and significance and because they are all prominent attractions for the park visitors who use the transportation system to view wildlife. As a result, these species are described separately in the following section. In addition, because other wildlife species, including those of management concern, use habitat along the road corridor and play important roles in the park's ecological system, they are described collectively at the end of the section.

DALL SHEEP (*OVIS DALLI DALLI*)

The Dall sheep population in Denali has always been a notable issue for park staff, as the protection of Dall sheep was the primary catalyst in the creation of Mount McKinley National Park in 1917 (NPS 2009c). Today, the sheep population garners additional attention. Since the Dall sheep is a high-altitude species with very particular habitat requirements, its population may be sensitive to, and an indicator of, climate and vegetation change (NPS 2009c).

Most of the mountainous terrain on the north side of the Alaska Range throughout the park provides habitat for Dall sheep, particularly the mountains in the easternmost and westernmost areas of the park. The deep snows on the south face of the Alaska Range preclude sheep from inhabiting that area. On the north side, some sheep migrate across the Park Road to and from the Alaska Range and the Outer Range each year (Dalle-Molle, J. and Van Horn, J. 1991; NPS 2006b). Since the Denali Park Road corridor meanders through several areas of sheep habitat north of the Alaska Range, close attention must be given to the use of the road so it does not fragment sheep habitat or sever movement routes (daily or seasonal) (Putera and Keay 1998).

In 2007, park staff closely monitored 20 Dall sheep with GPS radio collars to gather information on the effects of park road use on the sheep. This monitoring showed evidence that the sheep generally move farther away from the road as traffic volume increases. Thus, road use affects when and where the Dall sheep are able to forage, and in turn could limit the area and locations of available sheep habitat during certain times of year (particularly in spring when the sheep are more dependent on vegetation at lower elevations) (Putera and Keay 1998). Given these effects, under the three action alternatives for this plan, the park would manage traffic on the road to allow for gaps for the sheep to approach or cross the road, unimpeded by vehicle presence.

Dall sheep populations tend to fluctuate as a result of many environmental variables. Sudden population declines may occur following severe winters, summer droughts, or stochastic severe weather events. Regardless of these environmental variables, the sheep's naturally low birth rate and vulnerability to predation tend to keep population growth rates low (NPS 2009c; ADF&G 2008b). The population within the original park boundary is of special interest to wildlife managers because it is one of the few Dall sheep populations that is not currently hunted and still shares its range with a natural diversity and number of large predators. This population is also the same population group that is regularly viewed by visitors on the Park Road (NPS 2009c).

In the summer of 2008, NPS staff conducted aerial and ground surveys of Dall sheep in various population concentration areas of the park (east of the Muldrow Glacier and west of

the Nenana River). The aerial survey counted 1,526 sheep (NPS 2009c). This survey result was remarkably similar to an aerial survey of the same area in 1996 (1,563 sheep). This monitoring over time reveals that the Denali sheep population may be relatively stable. By extrapolating from this and other survey information, NPS staff have estimated the parkwide Dall sheep population to be approximately 2,500 (NPS 2009d). Along the Park Road corridor, the highest concentrations of Dall sheep were noted on the slopes of Polychrome Mountain (near Polychrome Overlook) and on both sides of the road on the slopes of Igloo Mountain, Sable Mountain, and Cathedral Mountain (between Igloo Creek and Sable Pass).

The 2008 surveys also revealed that the average size of a Dall sheep group is 7.7 individuals, with the largest group containing 48 sheep. The ground-based study in 2008 also provided information on the age and sex of the surveyed sheep. Approximately 30% of the sheep were sub-curl and full-curl rams and about 41% were "ewe-like" (i.e., adult female sheep or young male sheep with smaller horns). About 16% of the surveyed sheep were lambs. Like the overall population estimate in the park, these sex and age statistics are similar to the previous surveys in 1996 (NPS 2009c).

Dall sheep are prevalent throughout the mountains of Denali, between 3,000 and 6,000 feet in elevation, and on the north side of the Alaska Range (NPS 2009c). Dall sheep are found in relatively dry country and they frequent a special combination of open alpine ridges, meadows, and steep slopes with extremely rugged "escape terrain" in the immediate vicinity. They use the ridges, meadows, and steep slopes for feeding and resting. When danger approaches, they flee to the rocks and crags to elude pursuers (ADF&G 2008b; NPS 2009c).

Table 12 provides information on the likelihood that Park Road travelers going to various destinations would see at least one Dall sheep. For example, a visitor who plans to travel as far as Toklat has a 71% chance of seeing one or more Dall sheep somewhere along the way. This information was gathered using various methods, such as having bus drivers document where and when they see wildlife while driving along the road.

Table 12. Probability of Sighting Dall Sheep along the Denali Park Road, by Trip Destination

Destination	Probability of Sighting at Least One Dall Sheep
Teklanika	6%
Toklat	71%
Eielson	74%
Wonder Lake	74%

Source: NPS 2011 (based on wildlife sighting data from 2007 and 2008).

Male Dall sheep (rams) are distinguished from females (ewes) by their large curling horns, which grow larger as the animal ages. Adult ram horns reach a full circle or "curl" after about seven or eight years. The horns of the adult ewe are shorter, thinner, and only slightly curved (NPS 2009c).

The social system of the Dall sheep is quite structured. Adult rams live in bands that seldom associate with ewe groups except in late November and early December during the mating season. Throughout the year (with and without females present), adult rams engage in horn clashes with each other to establish or maintain order and dominance rank in the male bands (ADF&G 2008b). The rams are able to breed after about 18 months, but typically do not breed successfully until they attain full-curl horns and reach a dominant rank. Adult ewes typically have their first lamb after three years, and yield one lamb each year. Before ewes give birth to lambs in late May or early June, they seek isolation and protection from predators by migrating to the most rugged and steep terrain in their spring range (ADF&G 2008b). After remaining in the steep terrain for a few days, the ewe and lamb

move back to areas where the lamb can start feeding on spring vegetation (typically after one week). Lambs are usually weaned off the ewe milk by October.

Through summer, adult sheep and lambs rely on a variety of vegetation in their summer range. However, during winter, Dall sheep are forced to feed on dry, frozen grasses and sedges and other hardy vegetation that can be found sticking out through the snow cover in their winter range. Aside from their dietary dependence on vegetation, Dall sheep also eat soil around localized mineral licks. Since many different bands of sheep may congregate at any one particular mineral lick, these areas also serve as a medium to maintain genetic diversity. This is when and where young rams may leave their ewe and nursing band to join another random ram band that may also be present at the lick (ADF&G 2008b).

Figure 11 shows the sizes of various Dall sheep groups along the Park Road corridor. The data were derived from NPS Dall sheep monitoring conducted in the park in 2008 and 2009. Larger colored circles indicate larger sheep group sizes. Areas with congregations of several sheep groups (colored circles) identify where high concentrations of sheep are often found.

CARIBOU (*RANGIFER TARANDUS*)

Caribou are members of the deer family (*Cervidae*) that live in the arctic tundra, mountain tundra, and northern forests of North America, Russia, and Scandinavia (caribou are called reindeer in Europe). Caribou are the only member of the deer family in which both sexes grow antlers. The caribou and reindeer population throughout the world is estimated at 5 million (ADF&G 2008c). All caribou and reindeer are considered the same species, although several subspecies exist. The Denali herd belongs to one of the barren-ground subspecies of caribou.

Alaskan caribou are distributed across 32 herds (or populations). Each herd uses its own unique calving areas, although different herds may mix on their winter ranges (ADF&G 2008c). There are approximately 900,000 wild caribou in Alaska. However, caribou populations are somewhat cyclic, and the timing of cycles and degree of herd growth are quite unpredictable. Collectively, the population trends are dependent on climate and weather changes, population density, predation by wolves and grizzly bears, disease, and hunting.

The Denali caribou herd receives particular attention from wildlife biologists because it is the only barren-ground caribou herd in North America of such a large size class that is currently not subject to hunting. In addition, the Denali caribou share their range with a complement of large predators in a predator/prey system that is still intact and naturally regulated (NPS 2006b).

Like the Dall sheep, the Denali caribou herd has been a focus of attention for many years. Over the past 100 years, many changes to the herd have occurred. In the early decades of the 20th century, the Denali herd may have reached 20,000 animals (Murie 1944; NPS 2006b). The herd declined to about 10,000 caribou in the mid-1940s and maintained that size until the mid-1960s. Like other Alaskan caribou herds at that time, the Denali caribou herd population started dropping again in the mid-1960s due to a series of severe winters that increased adult mortality and lowered calf recruitment into the herd (Adams et al. 1989; NPS 2006b). Calf recruitment into the herd is affected by both birth rates and survival rates of caribou calves. In 1975, there were an estimated 1,000 animals in the herd (Troyer 1977; NPS 2006b).

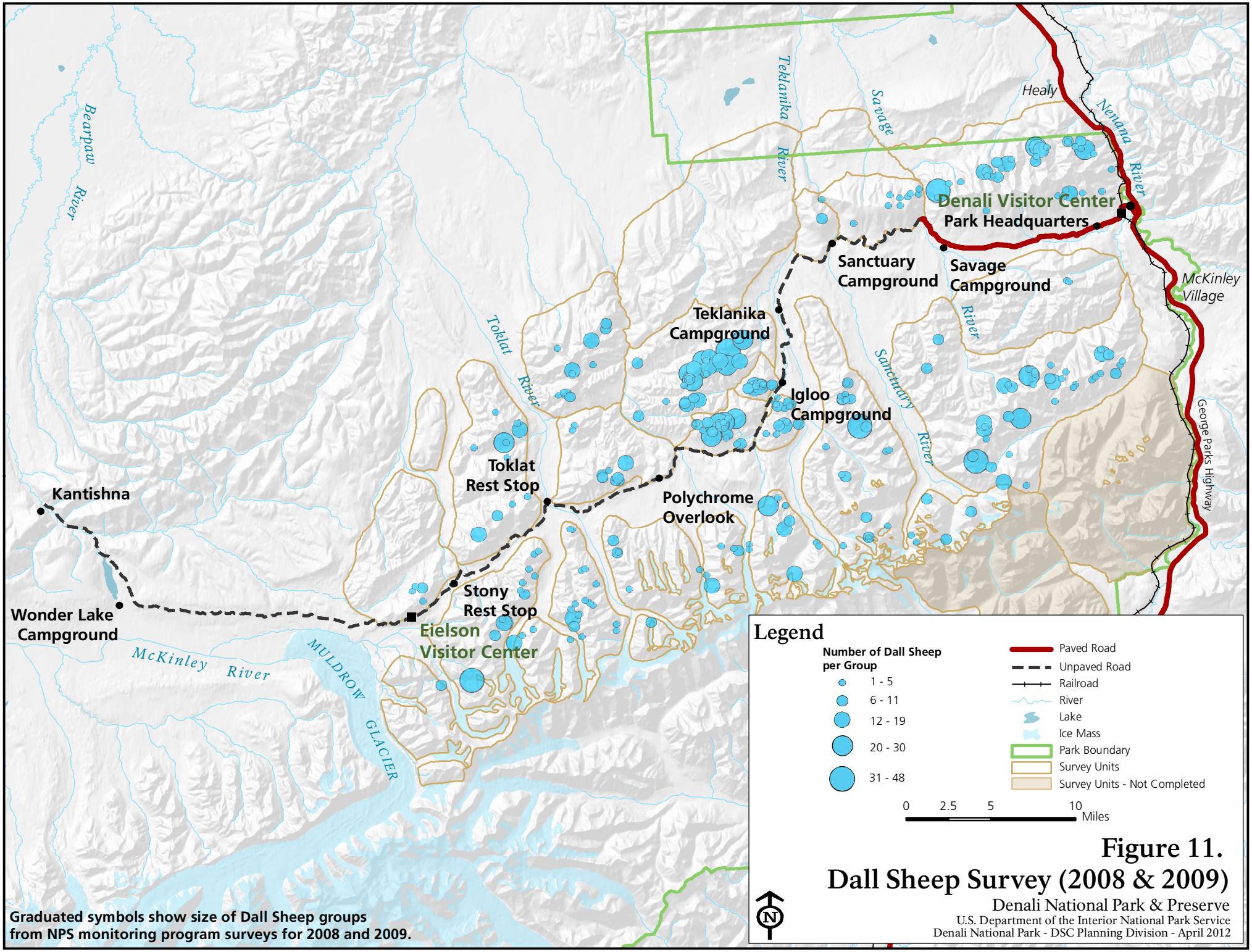


Figure 11.
Dall Sheep Survey (2008 & 2009)

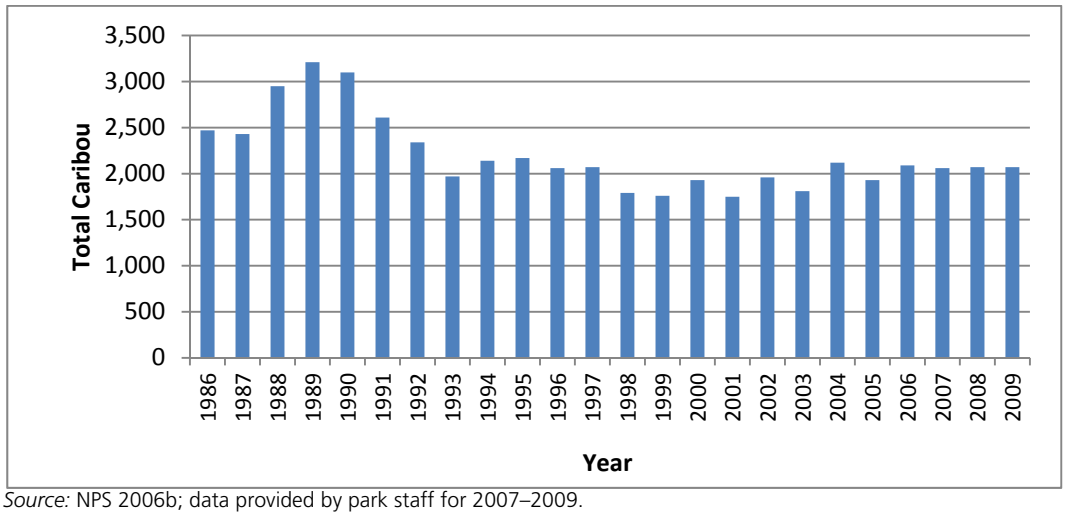
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Graduated symbols show size of Dall Sheep groups from NPS monitoring program surveys for 2008 and 2009.

Since the population low of the 1970s, the Denali herd has rebounded slightly due to various stretches of mild winters in the 1980s, reaching a population of about 3,200 caribou in 1990 (Adams and Mech 1995; NPS 2006b). However, subsequent years of severe winters and high calf predation reduced the herd to its present level of approximately 2,000 animals. As of the fall of 2009, the Denali caribou herd size was estimated at 2,070, which shows little variation in size over the past five years (Adams and Roffler 2009). This population is dispersed over about 3,900 square miles that include most of the park north of the Alaska Range and some areas south of the range and east of Mount McKinley (NPS 2006b). The table 13 graph shows the changes in the fall Denali caribou herd size over the past 25 years.

Table 14 provides information on the likelihood that Park Road travelers going to various destinations would see at least one caribou. For example, a visitor who plans to travel as far as Toklat has a 74% chance of seeing one or more caribou somewhere along the way. Park staff gathered this information using various methods, such as having bus drivers document where and when they see wildlife while driving along the road.

Table 13. Fall Denali Caribou Herd Size, 1986–2009



Source: NPS 2006b; data provided by park staff for 2007–2009.

Table 14. Probability of Sighting Caribou along the Denali Park Road, by Trip Destination

Destination	Probability of Sighting at Least One Caribou
Teklanika	42%
Toklat	74%
Eielson	83%
Wonder Lake	85%

Source: NPS 2011 (based on wildlife sighting data from 2007 and 2008).

Since calf recruitment is often correlated to herd size, park staff closely monitors the herd's calf:cow ratio. In September 2009, the Denali herd contained 23 calves per every 100 cows (Adams and Roffler 2009). This figure has been relatively stable over the past five years, which is notably higher than the rate during the severe winters in the 1990s, when it dropped to 12:100. Generally, cow caribou do not breed until they are 28 months old. Most adult cows are pregnant every year and give birth to one calf (ADF&G 2008c). Over the past five years, on average, only 29% of caribou calves survive their first summer through September. Predation is the primary threat to calves (Adams and Roffler 2009). In particular, wolves, grizzly bears, and golden eagles kill many newborn calves. To protect young from predation, and to escape insects, the caribou typically collect in large "postcalving aggregations" (ADF&G 2008c).

Since caribou are migratory herd animals, the Denali herd shifts in geographic distribution across the landscape throughout the year. The migrations coincide with their life cycle and climate conditions, from calving to summer foraging to autumn breeding. Caribou movements are often triggered by changing weather, such as the onset of cold weather or snowstorms. Once they decide to migrate, caribou can travel up to 50 miles a day (ADF&G 2008c).

Most cows in the Denali caribou herd bear their calves in the northern foothills of Mount McKinley, from the Muldrow Glacier to the Straightaway Glacier. A smaller number disperse farther north and west to calve in isolated areas, and even fewer cross the Alaska Range to calve in the Cantwell area. Historically, areas on the south side of the Alaska Range provide the primary calving grounds for the herd (NPS 1989).

After calving, caribou typically move to higher elevations (above 4,000 feet) for the first half of the summer. Throughout the summer visitation months in the park, caribou are quite common along the Park Road, particularly above tree line. During this time, caribou are usually visible foraging in the morning or evening hours, and are also seen while bedding down during the afternoon hours. During summer months, caribou typically eat willow leaves, sedges, flowering tundra plants, and mushrooms (ADF&G 2008c). Since the caribou are often harassed by insects during warm summer days, they commonly bed on snow fields or windy ridgelines to avoid insects (NPS 2006b). These higher altitude areas also provide ample forage.

As temperatures begin to drop and precipitation begins to increase by mid-summer, the Denali caribou usually disperse across the lower mountains and foothills of the park to forage until breeding season begins in mid-September. This is also when the bull caribou lose their antler velvet and begin to fight with other bulls. Most fights are brief and benign. However, occasional violent fights occur, leaving bulls killed or injured and prone to wolf and bear predation (ADF&G 2008c).

Once the rut begins with the onset of autumn, the caribou congregate into rutting groups along foothills of Mount McKinley, north through the Upper Moose Creek drainages and into the Toklat, East Fork, and Sushana River drainages (NPS 2006b). During this time, caribou typically switch their diet to lichens, dried sedges, and small shrubs (e.g., blueberry). Unlike most members of the deer

family, bull caribou do not control a harem of cows. Instead, they control a space around themselves, and prevent other bulls from breeding females within their space (ADF&G 2008c).

After the breeding season, the Denali herd typically winters on the tussock flats and adjacent foothills north of the Outer Range. They may also inhabit other winter ranges in the park, depending on how mild the winter is in a given year.

Figures 12, 13, and 14 show the average density ranges, or concentrations of radio-collared caribou along the Park Road corridor during three periods of the park visitation season: May 15 through June 30, July 1 through August 15, and August 16 through September 30. The data graphics were derived from NPS caribou monitoring programs conducted in the park from 1986 through 2008. On all three maps, the darker shadings indicate areas where the highest concentrations of caribou occurred during the respective time periods from May through September. Also, many of the caribou seen along the Denali Park Road are bulls, which have different distributions and movement patterns from those of cows. Thus, these maps do not present a complete picture of caribou movements and how those movements may affect wildlife viewing.

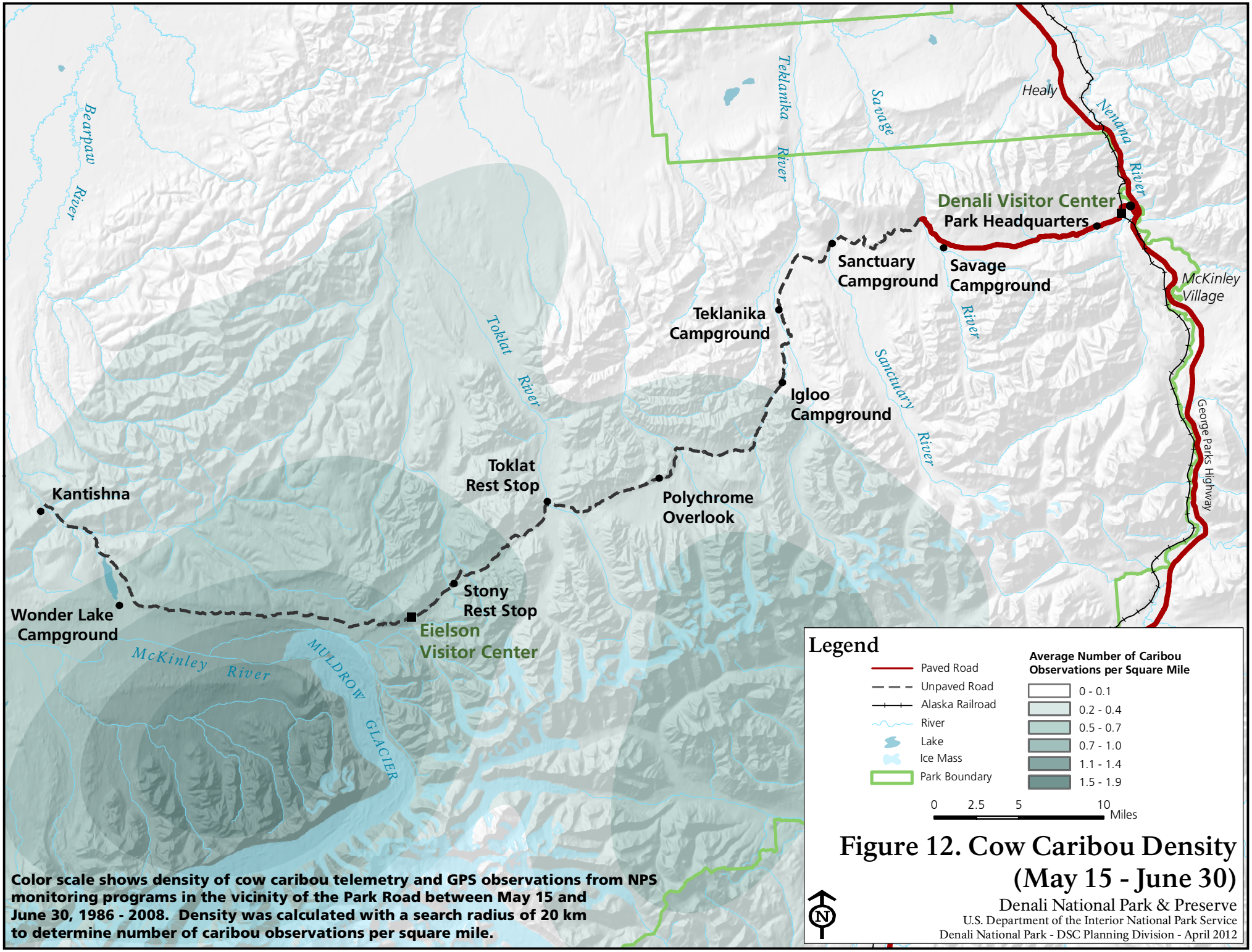
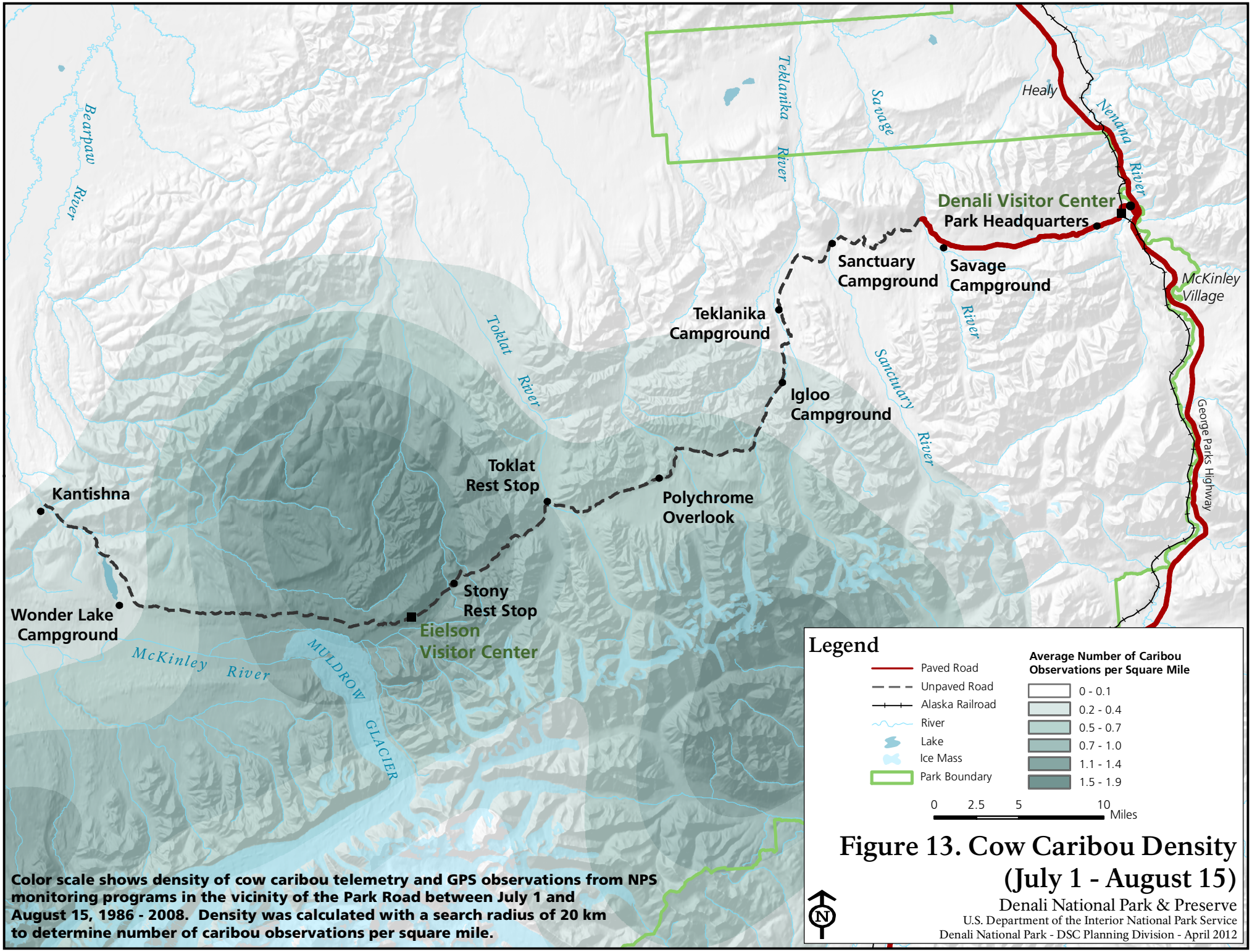


Figure 12. Cow Caribou Density (May 15 - June 30)

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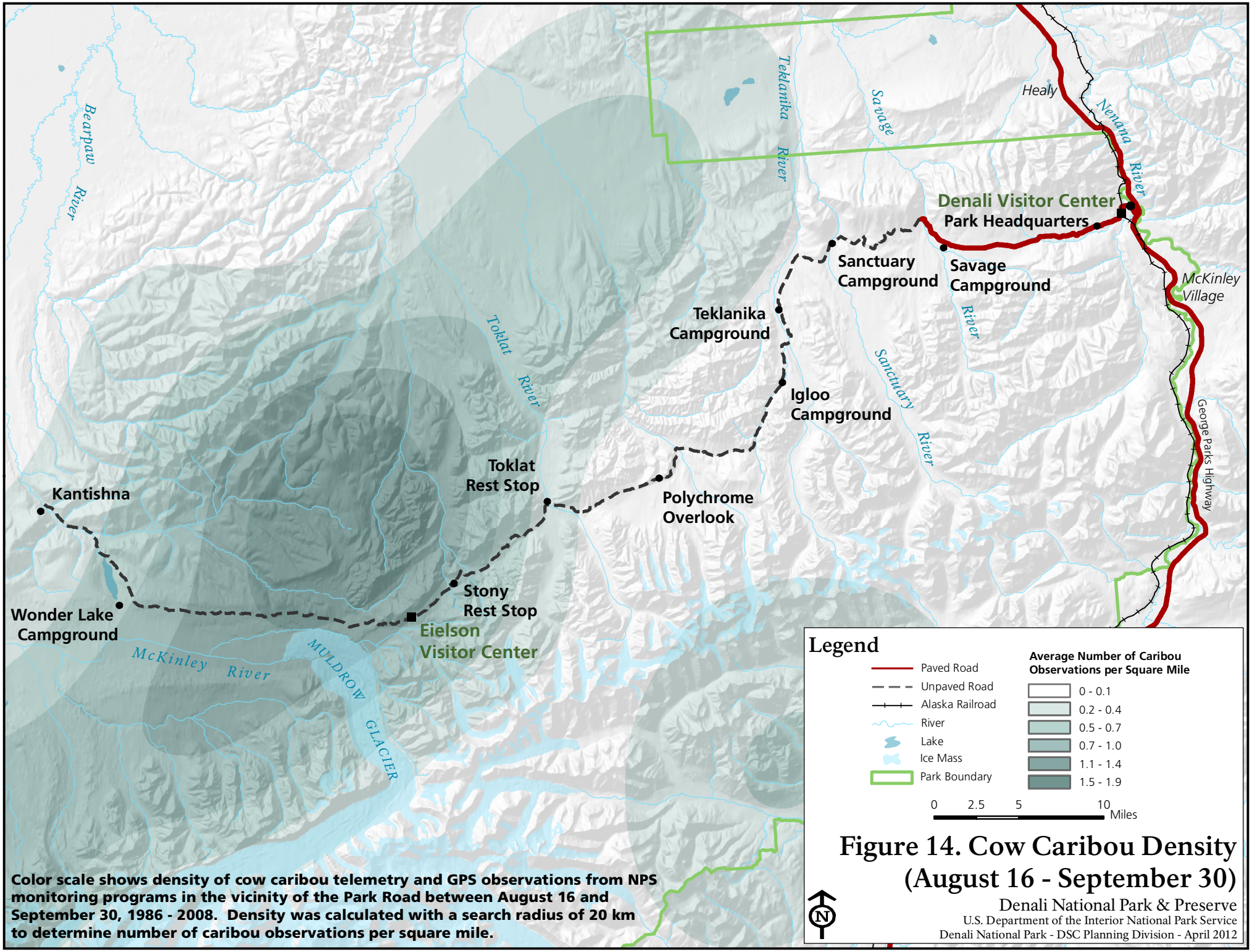
Color scale shows density of cow caribou telemetry and GPS observations from NPS monitoring programs in the vicinity of the Park Road between May 15 and June 30, 1986 - 2008. Density was calculated with a search radius of 20 km to determine number of caribou observations per square mile.



Color scale shows density of cow caribou telemetry and GPS observations from NPS monitoring programs in the vicinity of the Park Road between July 1 and August 15, 1986 - 2008. Density was calculated with a search radius of 20 km to determine number of caribou observations per square mile.

Figure 13. Cow Caribou Density (July 1 - August 15)

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Color scale shows density of cow caribou telemetry and GPS observations from NPS monitoring programs in the vicinity of the Park Road between August 16 and September 30, 1986 - 2008. Density was calculated with a search radius of 20 km to determine number of caribou observations per square mile.

Figure 14. Cow Caribou Density (August 16 - September 30)

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GRIZZLY BEAR (*URSUS ARCTOS HORRIBILIS*)

The grizzly bear (*Ursus arctos horribilis*) is a common and vital member of the overall Alaskan ecosystem. In the lower 48 states, the grizzly bear is listed as "threatened" under the Endangered Species Act. However, given its higher population in Alaska, the bear is classified as a game animal in Alaska with established regional hunting regulations. It is important to note the distinction between the common names "grizzly bear" and "brown bear," which refer to two separate subspecies of *Ursus arctos*. In Alaska, brown bear typically refers to the bears that occupy the coastal regions of the state; whereas, grizzly bear refers to the bears that occupy the northern, interior areas such as Denali National Park and Preserve (ADF&G 2008a). Today, population estimates indicate that more than 30,000 grizzly and brown bears live in Alaska. For the sake of comparison, more than 25,000 grizzly and brown bears live in Canada (USFWS 2007a).

Grizzly bears occupy a large range throughout the park, but are most common in the higher elevation habitat of shrub and tundra (NPS 2006b). Recent NPS bear monitoring studies at Denali have revealed a grizzly bear density of roughly 27 bears per 1,000 square kilometers (70 bears per 1,000 square miles) on the north side of the Alaska Range. This translates to 300 to 350 grizzly bears in the park to the north of the range. This population density is considerably lower than the density on the south side, presumably due to higher salmon availability on the south side (NPS 2009d).

Table 15 provides information on the likelihood that Park Road travelers going to various destinations would see at least one grizzly bear. For example, a visitor who plans to travel as far as Toklat has a 68% chance of seeing one or more grizzly bears somewhere along the way. Park staff gathered this information using various methods, such as having bus drivers document where and when they see wildlife while driving along the road.

Table 15. Probability of Sighting Grizzly Bears along the Denali Park Road, by Trip Destination

Destination	Probability of Sighting at Least One Grizzly Bear
Teklanika	14%
Toklat	68%
Eielson	86%
Wonder Lake	89%

Source: NPS 2011 (based on wildlife sighting data from 2007 and 2008).

The grizzly bear has a very large home range of 50 to 300 square miles for females and 200 to 500 square miles for males. The average lifespan of a grizzly bear is 15 to 20 years, with some living more than 30 years (USFWS 2007a). Grizzly bears usually spend spring and summer at the lower elevations of their range, and search for dens at higher elevations on isolated mountain slopes in autumn for winter hibernation. The bears typically enter the dens in October or November. When grizzlies emerge from their dens in spring (males in March or April, females in April or May), they often immediately seek carrion of other animals that succumbed to the winter. After regaining some strength, the bears then travel to the lower elevations of their range to areas that are wet, with greening herbaceous cover (USFWS 2007a).

For the most part, grizzly bears are solitary animals; most of their time is spent foraging independently. With the exception of interacting with other bears in concentrated feedings areas, the only times that grizzly bears associate closely with other bears is during mating season and when they are tending their young (USFWS 2007a). The mating season typically runs from May through July and the bears have one mate at a time, but several each year. Cubs are born in midwinter in the den; an average litter size is

two cubs. Grizzly bear cubs rely on their mother's milk for up to a year, and stay with their mother for two to three years. After separation, female cubs generally stay near their nursing grounds, whereas male cubs typically disperse (ADF&G 2008a).

The diet of the grizzly bear consists of both plants and animals, making it the largest omnivore in North America. More than 80% of the grizzly bear diet is plant based (e.g., roots, fruits, nuts, and green vegetation). In addition to feeding on plant material, grizzly bears opportunistically feed on carrion, small mammals, young or weak moose and caribou, salmon, and adult insects or insect larvae (USFWS 2007a). During spring, the Denali grizzly bears often prefer peavine roots (*Hedysarum alpinum americanum*), which grow on lower elevation slopes in the park (Murie 1981). By mid-summer, the grizzly bears in the region typically feed on grasses and sedges until late July, when various berries begin to ripen, particularly soapberries (*Shepherdia canadensis*) that grow on floodplain gravel bars (NPS 2006b) and blueberries (*Vaccinium uliginosum*). When herbaceous vegetation or fruits become limited in the fall, the bears revert to relying on roots as a primary food source.

Grizzly bears must travel widely across their range and habitat types to meet their life cycle needs that include foraging, mating, and raising their young (Weaver et al. 1996; Servheen et al. 1998). If the connections between various grizzly bear habitats are severed by roads and road use, the bears can become at risk from smaller populations and lower population viability (Chruszcz et al. 2003). In an attempt to ensure the protection of bear movement through the park, the Park Service has recently studied the effects of the Park Road on grizzly bear habitat and patterns of bear movement (Mace et al. 2012). This study revealed several different behavioral trends that vary relative to seasonality, habitat type, and sex.

Most notably, NPS researchers discovered that the bears in the study were most active and closest to the Park Road during high traffic, daytime hours, which suggests they are maintaining their normal diurnal behavioral patterns during summer months. Similarly, the bears crossed the Park Road at all times of day, but the highest frequency of crossing also occurred during the highest traffic periods. These observations may be an indication that grizzly bears are not measurably changing the timing of activity to avoid human disturbances along the road (Mace et al. 2012).

Researchers involved in the study also noted that bears moved faster when crossing the road, as compared to their rate of travel immediately before and after the crossing. In addition, bears tended to rest in an inactive state for longer periods farther from the road, which indicates that grizzly bears might not be comfortable enough to rest for long periods near the road. Also, the research data revealed that female bears moved substantially slower when in the road corridor, while males moved notably faster in the corridor. This observation could suggest that male Denali bears are more apprehensive around human/road activity than females. It could also suggest that female grizzlies and their cubs use the road corridor as passive protection from the threats of the male adult bears (Meier, pers. comm. 2010).

Human habituation is another factor to consider when assessing bear behavior at Denali. Habituation is "the waning of a response to a repeated, neutral stimuli" (Whittaker and Knight 1998). Bear habituation to human activity results as bears adapt to the presence of humans in a nonthreatening atmosphere (Smith et al. 2005). Although it is assumed that Denali grizzlies generally become habituated to human presence over time, some variation in the level of human habituation exists from individual to individual (Mace et al. 2012). Overall, the Denali bear study findings corroborate previous research efforts that concluded that some individual bears may

react negatively to vehicular traffic at specific places or times even though the bears generally are not altering the timing of their activities to avoid human disturbances along the road (Mace et al. 2012).

The following two maps provide information on the distribution and concentration of activity by a sample of grizzly bears along the Park Road corridor. The first map (figure 15) shows the average density ranges, or concentrations, of grizzly bears during the park visitation season. The data were obtained from a sample of 20 grizzly bears that were fitted with GPS radio collars that recorded hourly locations between May 15 and September 30, 2006. The darker shadings indicate areas where the highest concentrations of grizzly bear activity occurred during this time period. Not all of the bears in the study area were collared, so the data do not show overall bear activity, just the activity of these particular bears.

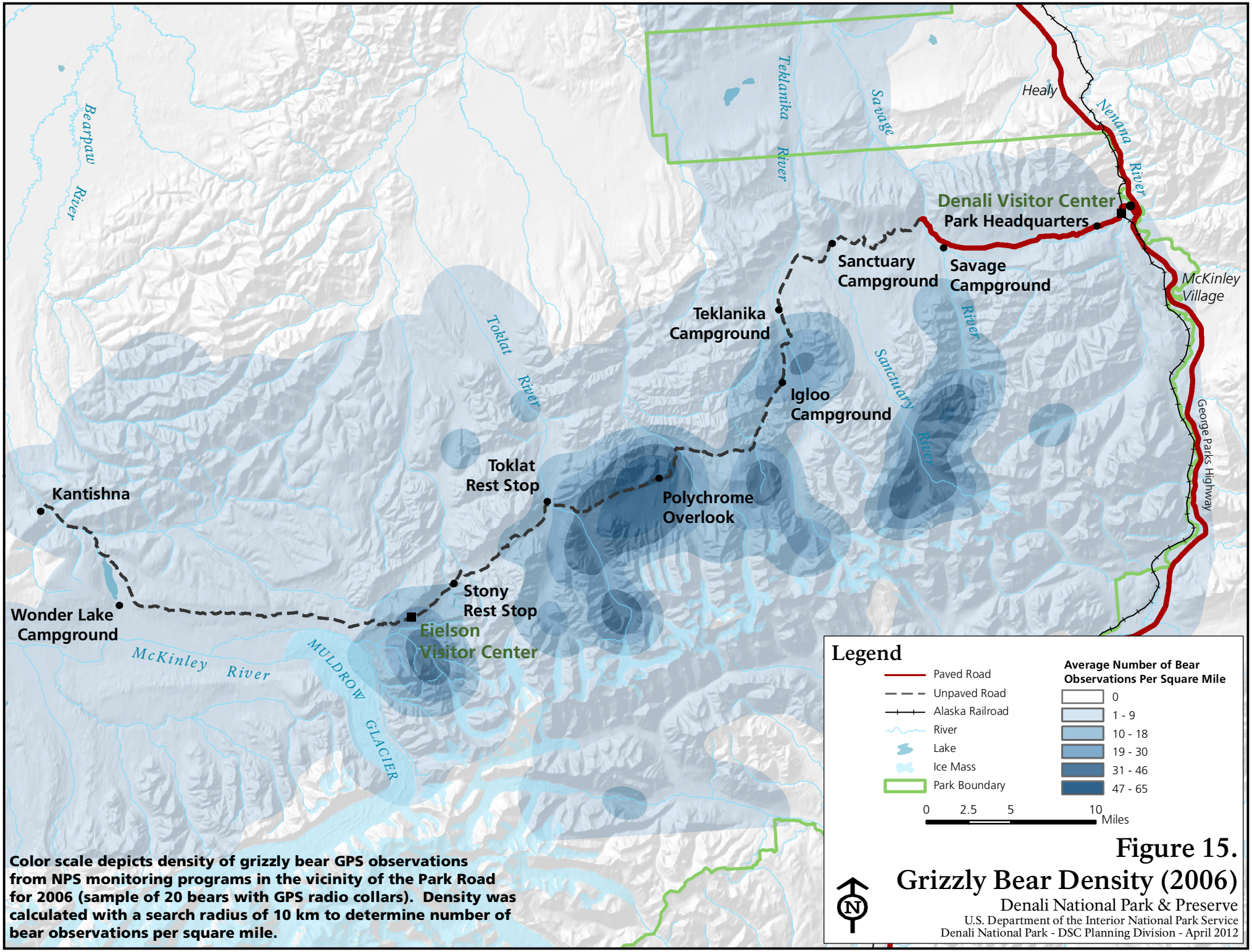
The second map (figure 16) identifies specific locations of male and female grizzly bear GPS observations during the same monitoring period in 2006. As discussed earlier, in general, female bear activity (shown in blue) tends to occur in areas closer to and along the Park Road corridor, while male bear activity (shown in brown) appears to be more dispersed and farther from the road. However, multiple areas exist where both male and female bears were observed (shown in purple).

GRAY WOLF (*CANIS LUPUS*)

The gray wolf inhabits much of Alaska's mainland and several of its islands. This range includes about 85% of Alaska's 586,000-square-mile area. Over this range are an estimated 6,000 to 7,000 wolves (USFWS 2007b). Although the geographic distribution of wolves across Alaska has remained fairly constant in recent years, their population estimate has varied considerably due to variations in weather, prey availability, disease, and harvest levels (ADF&G 2008d). Regardless, while the wolf is listed as threatened and endangered under the Endangered Species Act throughout the lower 48 states (depending on location), this Alaskan population of wolves is not protected by the act.

Wolves are members of the family *Canidae*. Most adult male wolves in interior Alaska weigh from 85 to 115 pounds, but they occasionally reach 145 pounds. Female adult wolves are smaller than males and typically do not weigh more than 110 pounds. Wolves reach adult size by about one year of age (ADF&G 2008d). Wolves can live up to 13 years and reproduce past 10 years of age (USFWS 2007b).

Through extensive wolf monitoring programs over the past 24 years, NPS staff have been able to closely track wolf populations, movements, and behavior at Denali National Park and Preserve. On the north side of the Alaska Range, staff have radio collared wolves from up to 16 different packs at any given time to gather the necessary data. When the monitoring began in 1986, the park had a very low spring wolf population estimate of 61 wolves (with a density of 3.5 wolves per 1,000 square kilometers). During that time, the population was likely affected by poaching and a series of mild winters that made it difficult for the Denali wolves to obtain food in winter (NPS 2009e; Meier 2009). Since then, the Denali spring wolf population estimate peaked at 134 in 1991, and averaged about 100 wolves in the park north of the Alaska Range. Generally, this population density range is considered quite low when compared to more temperate climates with more abundant food (NPS 2009e).



Color scale depicts density of grizzly bear GPS observations from NPS monitoring programs in the vicinity of the Park Road for 2006 (sample of 20 bears with GPS radio collars). Density was calculated with a search radius of 10 km to determine number of bear observations per square mile.

Figure 15.
Grizzly Bear Density (2006)

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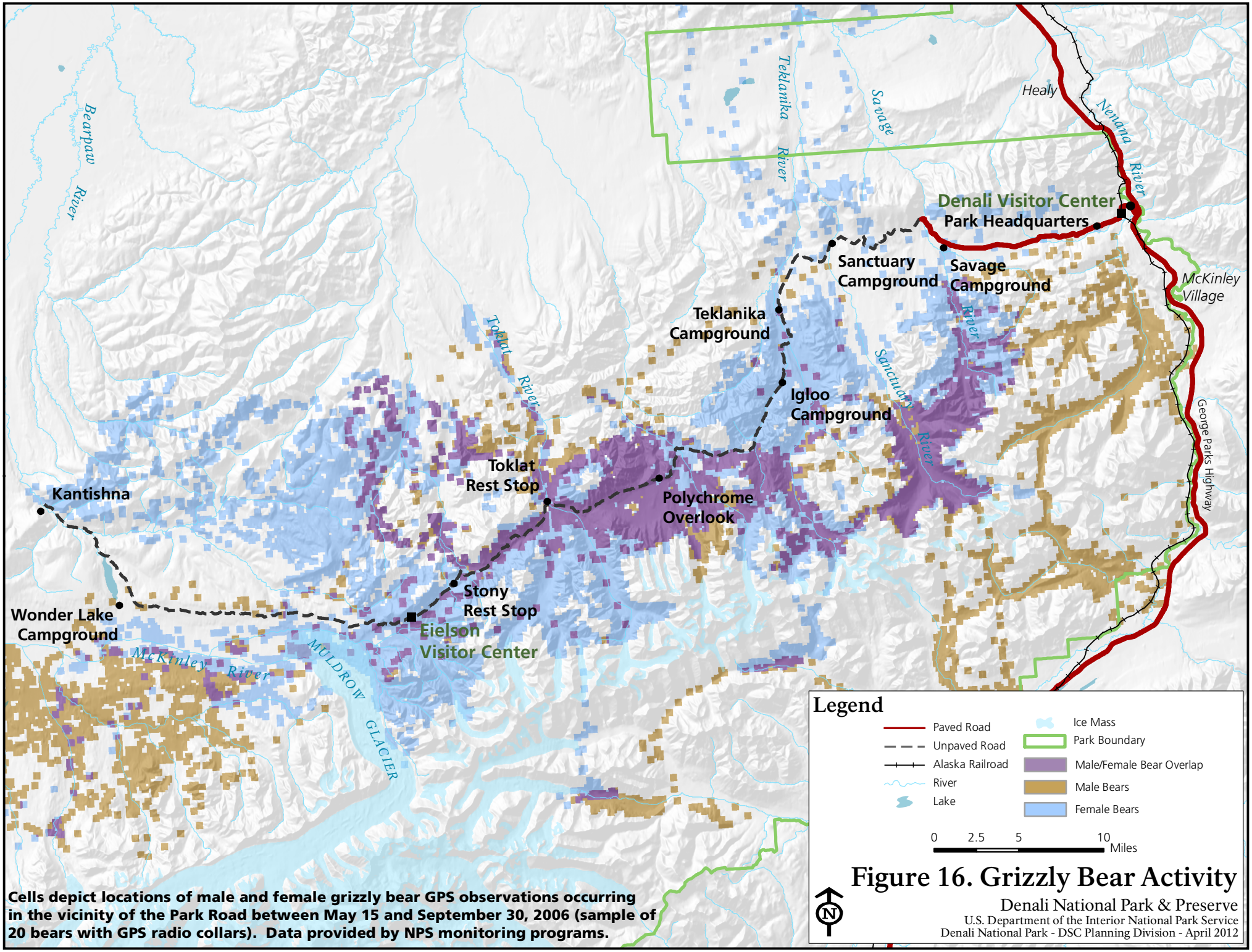


Figure 16. Grizzly Bear Activity

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Cells depict locations of male and female grizzly bear GPS observations occurring in the vicinity of the Park Road between May 15 and September 30, 2006 (sample of 20 bears with GPS radio collars). Data provided by NPS monitoring programs.

Via continued monitoring, NPS staff estimated the 2010 spring wolf population in Denali to be 60 wolves (3.46 wolves per 1,000 square kilometers) (Meier, pers. comm. 2010). This is the lowest wolf density observed since 1986. Only three packs in the park contained more than five wolves. Unfortunately, the cause of the low wolf population trend is difficult to discern as prey numbers are stable or increasing and the recent winters appear to have been severe enough to provide ample vulnerable prey. Park staff also have not identified any evidence of widespread disease or wolf harvest (Meier, pers. comm. 2010).

The size of the park's wolf population is primarily dependent on the abundance and vulnerability of ungulate prey species. During mild winters, prey—such as caribou, moose, and sheep— can move about freely in shallow snow cover and tend to be in good nutritional condition, which limits the number of kills the wolves are able to make. As a result, wolf numbers tend to be relatively low because of high dispersal rates of young adults, mortality of older wolves, and low pup production and survival (Adams and Mech 1995; Mech et al. 1998; NPS 2006b). Conversely, when winters are severe, the wolf population can rebound due to more vulnerable prey. In addition, wolf monitoring in the park has revealed that the wolf population can rebound quite rapidly. From 1987 to 1991 (from a period of mild winters to a period of severe winters), the park's estimated population more than doubled from 53 wolves in the spring of 1987 to 134 wolves in the spring of 1991 (Meier 2009; NPS 2006b).

Denali National Park and Preserve is one of the few areas in the world where humans are not the primary cause of wolf mortality. The park's monitoring program involved radio collaring more than 350 wolves since 1986, with approximately 20 to 30 individual wolves collared at any given time. Since the program's inception, park biologists have examined 190 collared wolves that have died. Of these mortalities, approximately 20% were killed by humans (primarily legal harvest outside park boundaries). More than 40% were killed by neighboring wolf packs, generally in winter when packs roam beyond their usual territories. The remaining 40% died of other natural causes (e.g., avalanche, starvation, drowning, old age, or disease) (NPS 2009e).

The overall Denali wolf population is made up of territorial packs. Fourteen different packs are currently being monitored in the park. Wolf packs include anywhere from 2 to 30 individuals, and typically consist of a breeding pair (or alpha pair), the pups of the year, and possibly a few yearling or adult wolves from earlier litters (Mech et al. 1998; NPS 2006b). On average, wolf packs typically include six or seven individuals. However, as noted earlier, only three of the packs in Denali contained more than five wolves as of 2010.

The pack territories range in size depending on how much prey is available and seasonal prey movement. The packs typically use their traditional area and defend it from other wolves (USFWS 2007b). Their ability to cover large areas to seek out vulnerable prey makes wolves effective hunters. For example, wolves may travel as far as 30 miles in one day. Although their average travel speed may be a 5-mile-per-hour (mph) trot, wolves are capable of reaching speeds of 40 mph while in pursuit over short distances (USFWS 2007b).

Four of Denali's wolf packs inhabit lands along the Park Road corridor and have dens fairly close to the road. These packs include the Nenana River pack, the East Fork pack, the Grant Creek pack, and the McKinley Slough pack. Monitoring has revealed that all four of these packs apparently had pups in 2010. Like the ranges of other wolf packs, the ranges occupied by these four packs have varied over time, with boundary shifts and varying degrees of overlap between pack territories. Other packs have occupied these areas, with other names, in the past. Park staff has noted that the East Fork pack has been observed to be the most persistent pack in the Park Road corridor (Meier, pers. comm. 2010).

Since all four current packs have dens that are near the road and are physically accessible by humans, the park has established closure areas to minimize disturbance to the den activity. These closure areas range in size from ½- to 1-mile radius around the dens. The park has historically applied this proactive approach to wolf habitat protection by preventing human disturbances to wolf dens and summer rendezvous areas. In turn, park staff have not documented any notable effects of humans on denning. However, staff have observed some variation in the levels of human habituation in various wolf packs.

In recent years, wolves from the Grant Creek pack have provided the most wolf sightings for visitors along the road, presumably because of their tolerance of humans (Meier, pers. comm. 2010). The Grant Creek wolves are typically seen along the road corridor west of the Toklat River.

Table 16 provides information on the likelihood that Park Road travelers going to various destinations would see at least one wolf. For example, a visitor who plans to travel as far as Toklat has a 12% chance of seeing one or more wolves somewhere along the way. Park staff gathered this information using various methods, such as having bus drivers document where and when they see wildlife while driving along the road.

At Denali, wolves generally inhabit the areas of the park that also support ungulate prey (where the elevation is less than 6,000 feet). Throughout most of the year, wolves roam throughout their territory in search of prey, and occasionally extend their hunt into territories of adjacent packs (NPS 2006b).

Table 16. Probability of Sighting Gray Wolves along the Denali Park Road, by Trip Destination

Destination	Probability of Sighting at Least One Gray Wolf
Teklanika	6%
Toklat	12%
Eielson	20%
Wonder Lake	21%

Source: NPS 2011 (based on wildlife sighting data from 2007 and 2008).

Wolves that are very dependent on migratory caribou in particular often abandon their territories for short periods and travel long distances for prey, if necessary (ADF&G 2008d). Several packs in Denali have overlapping territories, most likely from territory shifts that result from following migratory prey from year to year (Mech et al. 1998; NPS 2006b).

The breeding season for Denali wolves is in February, and litters averaging about five pups are born in dens in May. For the first six weeks, pups are reared in dens and are cared for by the entire pack (USFWS 2007b). In most cases, one adult female in each pack will produce one litter for the pack. However, multiple litters (from multiple adult females) per pack have been documented in the park (Meier et al. 1995).

From May to September, movements of yearling and adult wolves in a pack generally radiate from a central point, where the young pups remain because they are too small to travel with the adults. Initially, this point is typically the den. However, as the summer progresses, pups may also be moved to a rendezvous site away from the den. The adults in the pack continue to hunt from this central location throughout the remainder of the summer. By mid-September, pups are usually large enough to travel with the adults and the pack resumes nomadic hunting into winter (Mech et al. 1998; NPS 2006b). Just as overall pack territories are determined by prey

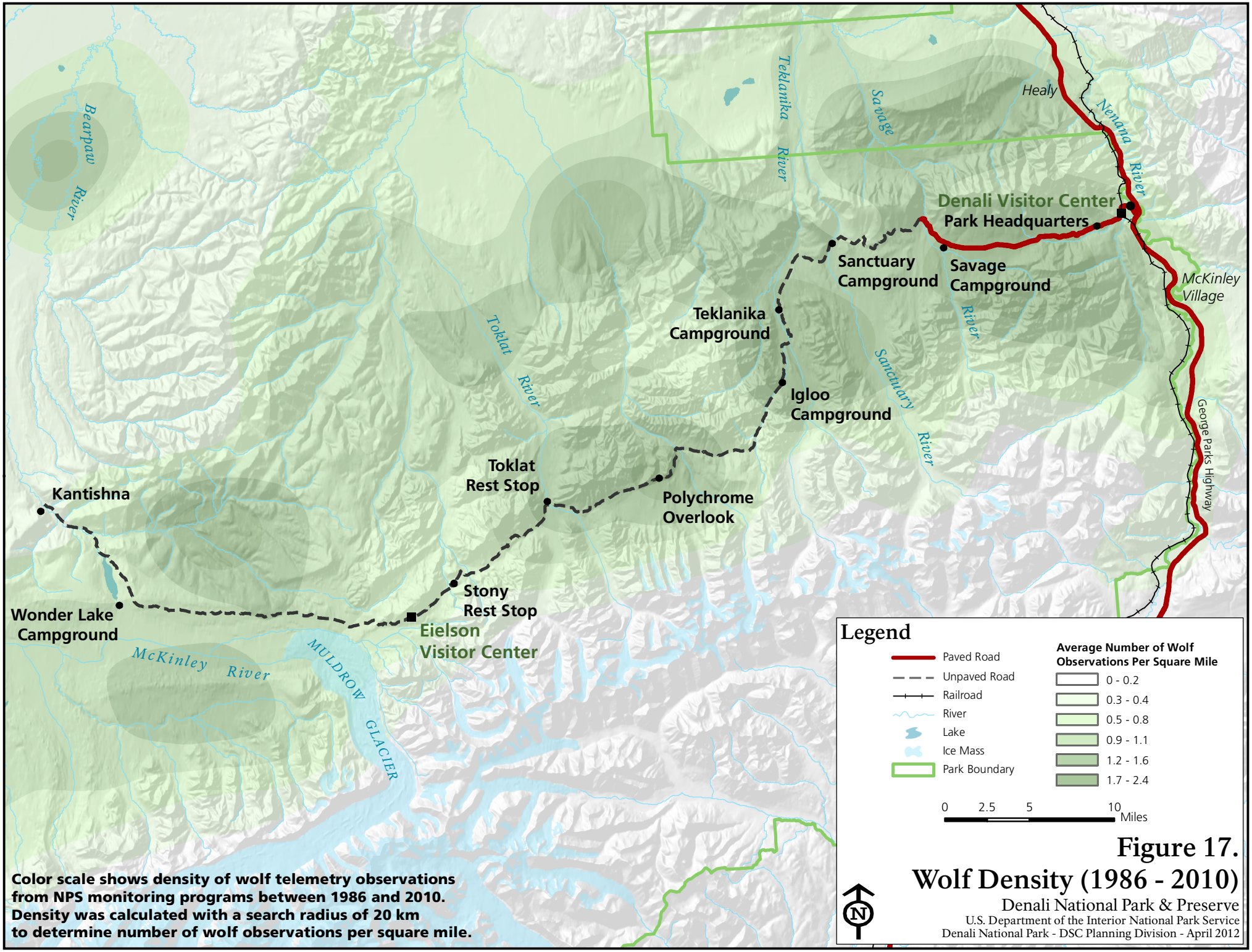
movement and locations, the seasonal habitat selection of wolves is largely dictated by their prey's seasonal habitat use patterns (Mech et al. 1998).

Wolves are opportunistic carnivores, and their primary food sources include moose, caribou, and Dall sheep. However, during summer months, small mammals such as voles, ground squirrels, snowshoe hares, beavers, birds, and fish may supplement their diet (ADF&G 2008d). The amount and frequency of killing large prey is often dependent on prey availability and environmental conditions; a wolf pack may eat regularly by killing a caribou or moose every few days. If conditions are limiting, they may go several days without eating.

According to an analysis of kill sites in the Denali wolf monitoring program, wolves typically kill many moose and caribou calves and Dall sheep lambs, as well as many older animals. However, the study indicates that wolves rarely kill healthy young adults of caribou, moose, or sheep. The results also indicate that wolves mainly feed on moose during mild winters with little snow. During severe, snowy winters, the Denali wolves tend to feed more on caribou. Some Denali wolf packs were found to seek and learn locations of concentrated Dall sheep use and find ways to gain a reliable food source from them as well (NPS 2009e).

Lastly, it is important to note the secondary roles that these predatory kills play in the Alaskan ecosystem. The remains of large mammals killed by wolves also provide a relatively consistent food source for a wide variety of other animal populations, including foxes, wolverines, ravens, and bears. In addition, wolves help regulate the balance between ungulates and their herbaceous food supply (USFWS 2007b).

The following two maps provide information on the distribution and concentration of gray wolf activity along the Park Road corridor. The first map (figure 17) shows the average density ranges, or concentrations, of wolf activity along the road corridor. The data graphics were derived from the NPS wolf monitoring that was conducted between 1986 and 2010. The darker shadings indicate areas where the highest concentrations of wolf activity occurred during this time period. The second map (figure 18) identifies specific locations of wolf activity observations from April 2008 through April 2010. The estimated geographic ranges of the various wolf pack territories in the area are overlaid on the map. The wolf pack names and spring pack sizes are also shown within each pack territory.



Color scale shows density of wolf telemetry observations from NPS monitoring programs between 1986 and 2010. Density was calculated with a search radius of 20 km to determine number of wolf observations per square mile.

Figure 17.
Wolf Density (1986 - 2010)

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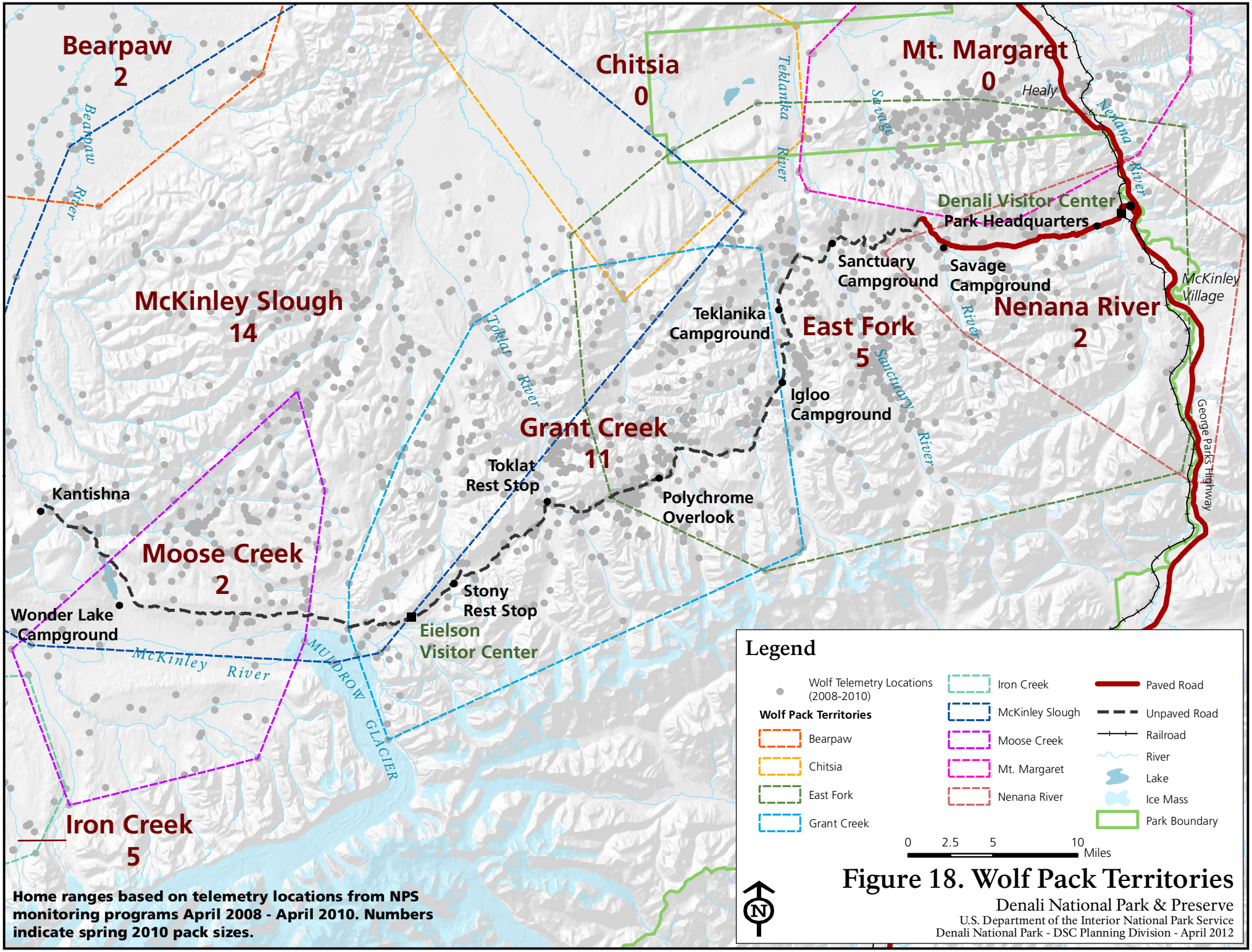


Figure 18. Wolf Pack Territories

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MOOSE (*ALCES ALCES*)

The moose is a fairly common sight for Denali visitors traveling along the Park Road. As the world's largest member of the deer family (*Cervidae)*, moose are generally associated with northern forests around the world in North America, Europe, and Russia. Adult male moose weigh from 1,200 to 1,600 pounds at maturity, while adult females typically weigh from 800 to 1,300 pounds. The lifespan of a moose is typically less than 16 years. Like most other members of the deer family, only the males (bulls) have antlers, which are grown each summer and shed each winter. As for social behaviors, moose communicate with each other through vocalizations, other noises, body posturing, and odors (ADF&G 2008e).

In the autumn of 2008, NPS staff conducted moose surveys in the park north of the Alaska Range to continue a moose monitoring program that updates population data for a predetermined survey area every three years. As of 2008, staff estimated 1,279 moose in the 10,004-square-kilometer area (approximately one moose for every 8 square kilometers). This population estimate is higher than the 2004 estimate of 1,104 moose in the same area (Owen and Meier 2009; NPS 2009f). When populations in areas south of the Alaska Range are incorporated, NPS staff estimate the parkwide moose population is likely between 2,000 and 2,500 (NPS 2009d). Although the moose population in the park has been fairly stable over the years, the moose population along the Park Road corridor (at least from headquarters to Teklanika), has declined by about half since the early 1970s, as has the number of moose sighted from the Park Road (Burson et al. 2000; NPS 2006b).

The 2008 moose survey also yielded a calf:bull:cow ratio of 24:54:100. This translates to calves, bulls, and cows making up about 13%, 31%, and 56% of the overall population, respectively. Although the overall 2008 population estimate was similar to the 2004 estimate, this 2008 ratio varied more from the 2004 ratio. In 2004, the calf:bull:cow ratio was estimated at 39:88:100 (17%, 39%, and 45% of the estimated population, respectively) (Owen and Meier 2009; NPS 2009f).

The importance of monitoring moose populations is heightened by the animal's high reproductive potential. Moose can quickly overpopulate a range if their survival and reproduction are encouraged by mild winters and a lack of predation and hunting (ADF&G 2008e). In Denali, moose are primarily preyed on by wolves and grizzly bears. These predators often target moose calves as prey; however, they are also opportunistic in taking adult moose as well. In addition to natural predation, changes in the Denali moose population correlate to winter weather patterns. Deep, crusted snow can result in malnutrition and subsequent death of large numbers of moose. This often leads to a decrease in both the birth rate and the survival of calves in the following year (ADF&G 2008e). Also, as winter snow depths increase, moose become more prone to winter predation by wolves due to their weakened state and their difficulty in traversing deep snow to escape.

Moose inhabit the entire vegetated planning area in the park except the highest tundra communities (NPS 2006b). Moose concentrations vary seasonally throughout the park. Like the caribou, moose make seasonal movements to calving, breeding, and wintering areas. They can travel anywhere from a few miles to as many as 60 miles during these seasonal migrations (ADF&G 2008e). During winter months, the location of moose in the park is dependent on the timing and depth of snow.

Table 17 provides information on the likelihood that Park Road travelers going to various destinations would see at least one moose. For example, a visitor who plans to travel as far as Toklat has a 43% chance of seeing one or more moose somewhere along the way. Park staff gathered this information using various methods, such as having bus

drivers document where and when they see wildlife while driving along the road.

Table 17. Probability of Sighting Moose along the Denali Park Road, by Trip Destination

Destination	Probability of Sighting at Least One Moose
Teklanika	35%
Toklat	43%
Eielson	44%
Wonder Lake	58%

Source: NPS 2011 (based on wildlife sighting data from 2007 and 2008).

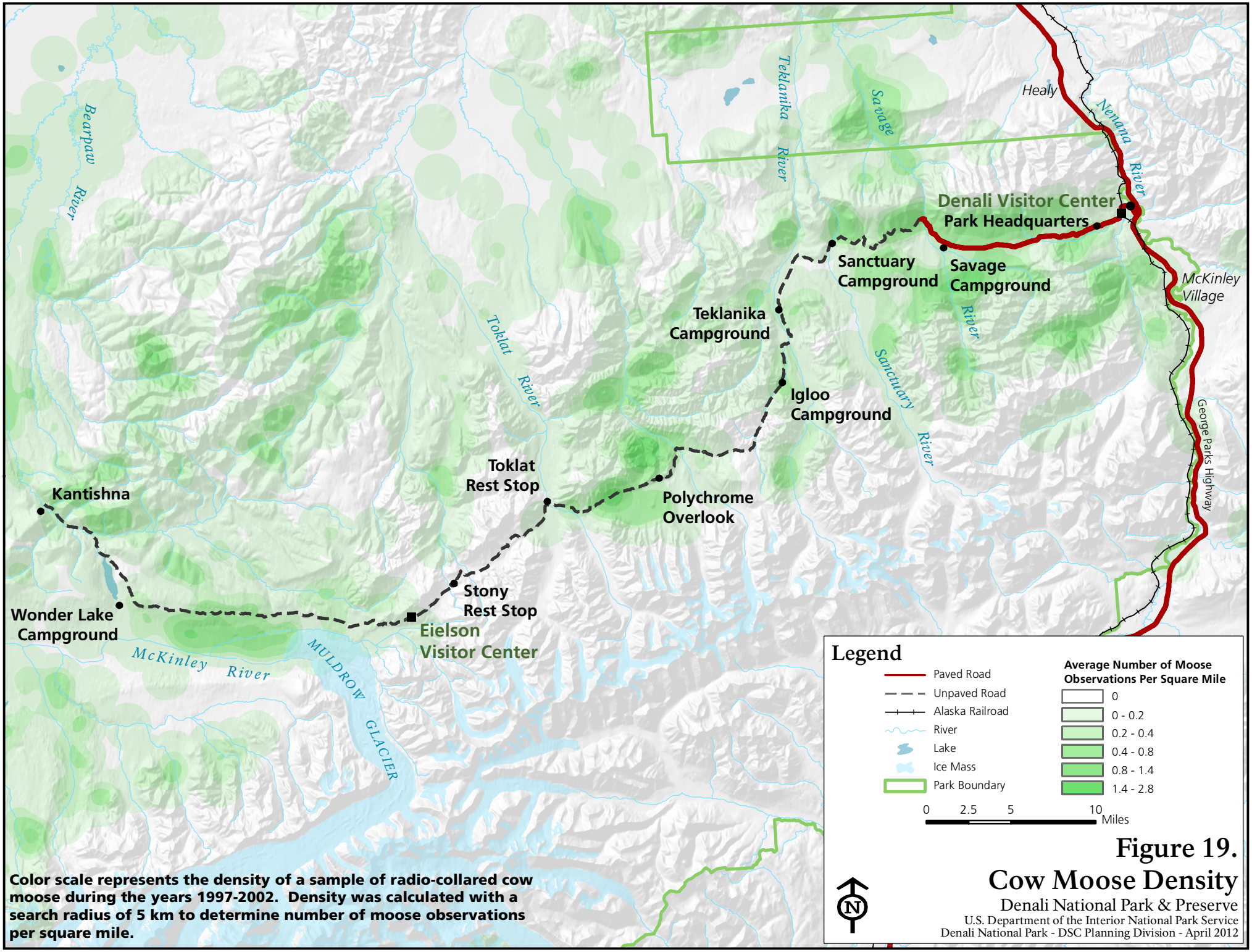
Cow moose typically breed for the first time at the age of 28 months. After a gestation period of about 230 days, the cows typically seek areas within their home range that provide low predator densities (such as islands in rivers) or improved visibility (NPS 2006b). The calves are usually born from mid-May to early June. Once young are born, the cow moose defends her newborn(s) vigorously through the first summer. After calving, moose typically move to higher elevations. When the cows are ready to begin breeding again in the autumn, the calves are usually weaned from the mother. However, the calf remains with the mother for its entire first year until the mother is ready to give birth to the following year's calf, at which point the mother aggressively chases off her one-year-old offspring (ADF&G 2008e).

Moose breed in autumn with the peak of the "rut" coming in late September and early October. During this time, bull moose compete for breeding females by bringing their antlers together and pushing. Serious battles are rare, but bulls often receive injuries from such bouts (ADF&G 2008e).

The area of the park from the park headquarters to the Savage River often supports a relatively high density of moose for interior Alaska. During early autumn, large rutting congregations occur between mile 6 and mile 15 of the Park Road. Fall rutting congregations can reach sizes of 50 or more moose, and it may be possible to witness bulls sparring to determine dominance. The autumn breeding and post-breeding concentrations typically occur in subalpine habitats. When winter sets in with increasing snow depths, the moose return to lower elevations (ADF&G 1992; NPS 2006b).

Moose typically consume large quantities of willow, birch, and aspen twigs in autumn and winter. In concentrated foraging areas, moose are known to establish a browse line or "hedge" 6 to 8 feet above the ground by trimming off the top branch and shoots of shrubs. As ground vegetation becomes green in spring, moose typically forage on sedges, horsetail, aquatic plants, and grasses. During summer, moose feed on vegetation in shallow ponds, forbs, and the leaves of birch, willow, and aspen (ADF&G 2008e).

The following map (figure 19) provides information on the distribution and concentration of moose activity along the Park Road corridor. The data graphics were derived from NPS cow moose monitoring efforts that were conducted between 1997 and 2002. The darker shadings indicate areas where the highest concentrations of moose activity occurred during this time period.



Color scale represents the density of a sample of radio-collared cow moose during the years 1997-2002. Density was calculated with a search radius of 5 km to determine number of moose observations per square mile.

Figure 19.
Cow Moose Density

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OTHER WILDLIFE

The Denali Park Road crosses several different natural communities as it traverses the park from the eastern boundary to Kantishna. In addition to crossing habitat for the five large mammals of Denali—Dall sheep, wolf, caribou, moose, and grizzly bear (as described in other parts of this "Affected Environment" section)—the road passes through habitat for a variety of other wildlife. Each wildlife species that occupies areas along the road corridor plays a role in the park's food web and ecological system. Many of the small mammal herbivores assist in the control and distribution of vegetation across the landscape, and also serve as prey to the larger mammals of the park such as the grizzly bear or wolf. Thus, it is equally important to consider the habitat condition for these other wildlife species in addition to the habitat condition for the five prominent mammals of Denali.

The park's terrain, soils, climate, and history are the attributes that determine the plant and animal communities that inhabit Denali's varied landscape. Plant ecologists and wildlife biologists for the park have identified three distinct natural community types in the park—boreal lowland, subalpine, and alpine. Some of the wildlife species in Denali occupy only one community type, whereas other species are more opportunistic or migratory, and inhabit different natural communities at different times of year.

Denali park staff have documented 39 mammal species, 169 avian species, 1 amphibian species, and 15 fish species that inhabit these natural communities of the park. In addition, the biological community of the park includes a vast array of insects, bacteria, and algae (NPS 2009g; Meier, pers. comm. 2010).

Mammals

A wide variety of small mammals inhabit the park, including the areas in the vicinity of the Park Road corridor. Some of these mammal species are frequently seen by park visitors traveling the Park Road due to their large populations, daytime activity, habitat elevation range, and/or tolerance or adaptation to human presence along the road. Red squirrels (*Tamiasciurus hudsonicus*), Arctic ground squirrels (*Spermophilus parryii*), and snowshoe hares (*Lepus americanus*) are examples of small mammals that are prevalent and viewable along the road corridor. Red foxes (*Vulpes vulpes*) are quite adaptable to varying natural communities and elevations, and are also commonly seen along the Park Road in most years (NPS 2009g).

In addition to the squirrels and snowshoe hares, other small mammal herbivores and insectivores inhabit the lower elevations of the road corridor (e.g., boreal lowlands), including the northern flying squirrel (*Glaucomys sabrinus*), shrews (*Sorex* spp.), lemmings (*Lemmus* sp. and *Synaptomys* sp.), and voles (*Clethrionomys* sp. and *Microtus* spp.). In addition to the red fox, other small- and medium-sized mammal carnivores depend on these smaller mammals as a food source, including the marten (*Martes americana*), lynx (*Lynx canadensis*), coyote (*Canis latrans*), wolverine (*Gulo gulo*), ermine (*Mustela erminea*), least weasel (*Mustela nivalis*), and mink (*Mustela vison*) (NPS 2006b, 2009f). The beaver (*Castor canadensis*) is also a common herbivore in the boreal lowlands of the park, and plays an essential role in the riparian corridors and wetland complexes of the park's taiga.

As the Park Road meanders through the landscape into the subalpine community, Arctic ground squirrels, snowshoe hares, porcupines, and red foxes are a few of the most common small- to medium-sized mammals that occupy habitat along the road corridor (NPS 2006b, 2009f). Arctic ground squirrels are prevalent during the summer

months, although they hibernate for seven months of the year. The snowshoe hare generally inhabits the lower, forested communities. However, when their cyclical populations are high, they are also common in the higher, subalpine areas of the park. The snowshoe hare is an important food source for other wildlife in the park, such as lynx, coyote, or golden eagle. Therefore, when hare populations are high, these other wildlife species benefit substantially. According to park staff monitoring efforts, the snowshoe hare population has recently risen to its highest levels in more than 20 years. However, this abundance of snowshoe hares also has negative effects on vegetation, as the hare is known to chew the bark off willows and dwarf birch. This causes shrub die-off along the viewshed of the Park Road (NPS 2010a).

The collared pika (*Ochotona collaris*) and hoary marmot (*Marmota caligata*) are common mammals that inhabit the rocky terrain in the higher subalpine and alpine areas of the road corridor. Hoary marmots typically develop loosely formed colonies and hibernate for up to eight months of the year. The pika is active year-round; however, to get through the winter, a pika depends on seeds and grasses it collected and stored during the summer months (NPS 2006b, 2009f).

Birds

Of the 169 avian species documented in the park, most are migratory visitors that occupy the park during breeding season (April through October); only 25 of the bird species are year-round residents of Denali. However, approximately 116 of the bird species have been documented to breed in the park (NPS 2006b). Some of the bird species in the park are quite selective in habitat use and may occupy only one general plant community (e.g., boreal lowlands). Other avian species in the park may have broader resident or migratory ranges. These birds may occupy the boreal lowlands, subalpine areas, or alpine areas at different times or for different purposes (e.g., nesting versus foraging).

The greatest diversity of Denali's resident and migratory bird species inhabit the park's boreal lowlands community. Some of the common species that occupy these lower forested areas include northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), great horned owl (*Bubo virginianus*), boreal owl (*Aegolius funereus*), various woodpeckers (*Picoides* spp.), spruce grouse (*Falcipennis canadensis*), black-capped and boreal chickadees (*Poecile atricapilla* and *P. hudsonica*), ruby-crowned kinglet (*Regulus calendula*), yellow-rumped warbler (*Dendroica coronata*), white-crowned sparrow (*Zonotrichia leucophrys*), and white-winged crossbill (*Loxia leucoptera*). Woodpeckers are quite prevalent in the woodlands, in both diversity and numbers; all species are resident, except for the northern flicker (*Colaptes auratus auratus*). The boreal riparian areas are home to kingfishers (*Ceryle alcyon*) and American dippers (*Cinclus mexicanus*). The wetland complexes and other open water areas of the boreal lowlands are nesting grounds and foraging grounds for sandhill crane (*Grus canadensis*), trumpeter swan (*Cygnus buccinator*), common loon (*Gavia immer*), mew gull (*Larus canus*), Arctic tern (*Sterna paradisaea*), northern waterthrush (*Seiurus noveboracensis*), rusty blackbird (*Euphagus carolinus*), and many species of migratory waterfowl (NPS 2006b, 2009f).

Some of the common birds of the subalpine zone (both resident and migratory) include willow ptarmigan (*Lagopus lagopus*), northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), short eared owl (*Asio flammeus*), northern hawk-owl (*Surnia ulula*), Arctic warbler (*Phylloscopus borealis*), olive-sided flycatcher (*Contopus cooperi*), gray-cheeked and Swainson's thrushes (*Catharus minimus* and *C. ustulatus*), fox sparrow (*Passerella iliaca*), golden-crowned sparrow (*Zonotrichia atricapilla*), blackpoll warbler (*Dendroica striata*), and orange-crowned warbler

(*Vermivora celata*) (NPS 2009g). Various subalpine open water bodies in Denali provide important breeding habitat for the Arctic tern and long-tailed jaeger (*Stercorarius pomarinus*) (NPS 2006b). Other shorebirds that nest in subalpine open water, wetlands, or riparian habitat include the whimbrel (*Numenius phaeopus*), upland sandpiper (*Bartramia longicauda*), surfbird (*Aphriza virgata*), semipalmated plover (*Charadrius semipalmatus*), yellowlegs (*Tringa* spp.), solitary sandpiper (*Tringa solitaria*), and wandering tattler (*Heteroscelus incanus*) (NPS 2006b). An index of the abundance of willow ptarmigan is calculated annually by park staff. Since 1988, the park staff has used the index to track the different phases (high or low) of the ptarmigan cycle (McIntyre, pers. comm. 2010). In recent years, the ptarmigan's population has been quite stable and healthy (NPS 2010a).

At higher elevations, in the alpine vegetation community, several bird species are found during certain times of the year. These species make use of this high, open landscape, particularly for summer foraging. Some species that are known to inhabit the alpine areas of Denali include golden eagle (*Aquila chrysaetos*), gyrfalcon (*Falco rusticolus*), white-tailed ptarmigan (*Lagopus leucurus*), American golden-plover (*Pluvialis dominica*), surfbird, long-tailed jaeger, horned lark (*Eremophila alpestris*), northern wheatear (*Oenanthe oenanthe*), and gray-crowned rosy finch (*Leucosticte tephrocotis*) (NPS 2009g).

As noted in the "Mammals" section above, the snowshoe hare population has spiked to very high levels in recent years (NPS 2010a). This population boom also results in a spread of snowshoe hares at higher elevations. This benefits raptors such as the golden eagle, which prey on small mammals on the landscape at or above the tree line.

Two bird species at Denali are considered federal species of concern (formerly federal candidate category 2 species)—the harlequin duck (*Histrionicus histrionicus*) and olive-sided flycatcher. The species of concern status does not provide protection under the Endangered Species Act. However, NPS policy directs the park to manage such species as threatened or endangered until additional data on their population sizes and distributions show otherwise. The olive-sided flycatcher nests in low, wet, and open areas of the park's boreal forests. Harlequin ducks are known to inhabit fast-moving clear streams and rivers. Harlequins have been documented in the park, and park staff estimates that some of the clear water streams in the park support breeding populations (NPS 2006b).

In addition, the olive-sided flycatcher, gray-cheeked thrush (*Catharus minimus*), and blackpoll warbler are on the state of Alaska species of special concern list (ADF&G 2010; McIntyre, pers. comm. 2010). The olive-sided flycatcher is also listed as a bird of conservation concern by the U.S. Fish and Wildlife Service's Migratory Bird Program. This listing establishes management priorities for species such as the olive-sided flycatcher to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973" (USFWS 2008; McIntyre, pers. comm. 2010).

Amphibians

The wood frog (*Rana sylvatica*) is the only amphibian species that is known to inhabit Denali. This amphibian occupies woodlands and wetland areas of the boreal lowland forests in the park. The wood frog survives the harsh Alaskan winter by hibernating in the upper layer of the previous year's dead vegetation (NPS 2006b).

Natural Communities

Figure 20 shows the general distribution of the three primary natural community zones along the Park Road corridor—boreal lowland, subalpine, and alpine. The natural community boundary estimations were derived from a detailed NPS vegetation survey conducted by park staff in 2008.

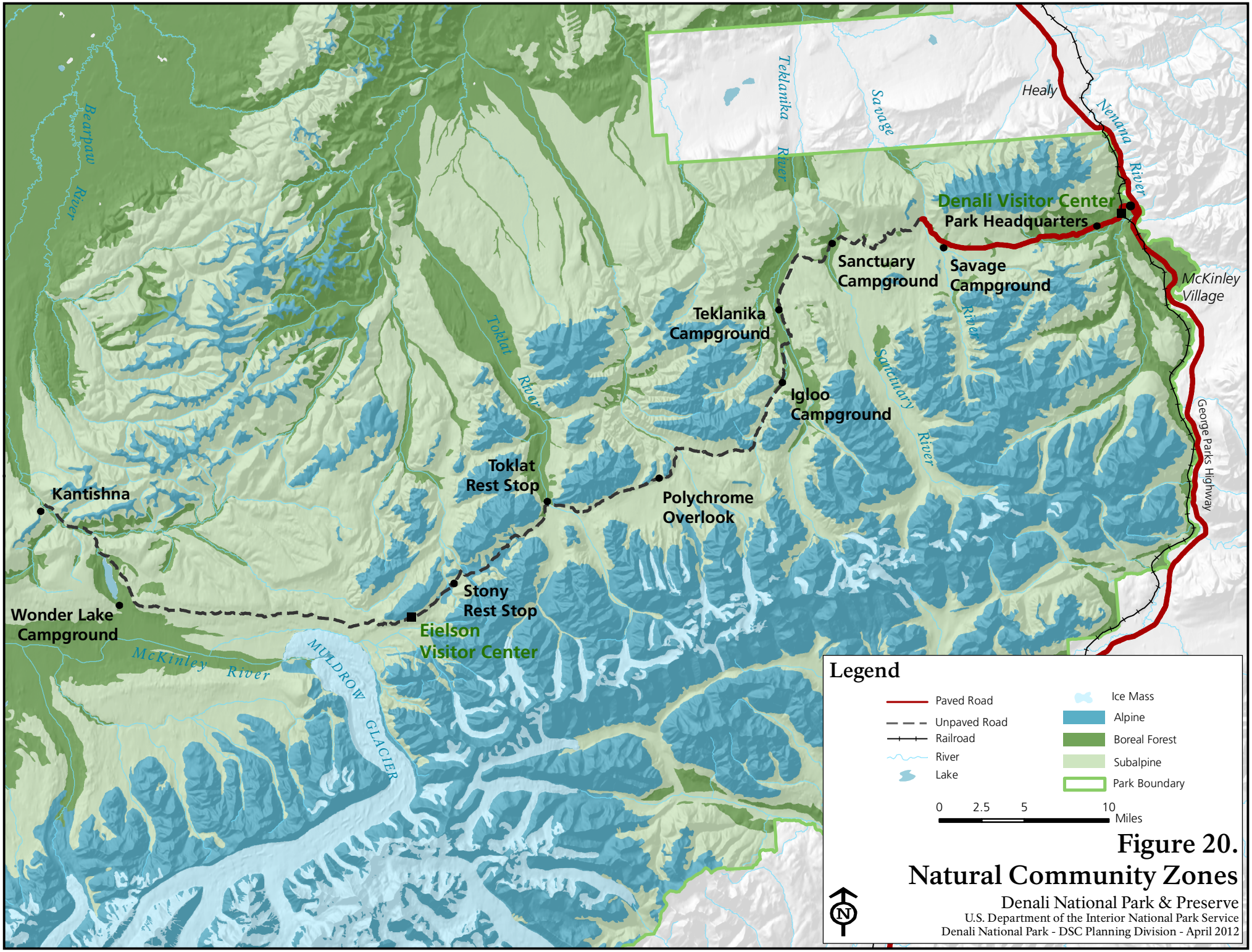


Figure 20.
Natural Community Zones

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WILDERNESS

THE WILDERNESS ACT

The Wilderness Act of 1964 established the definition of wilderness that is applied to applicable federal lands throughout the U.S. The act states

> *"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."* (Public Law 88–577 (16 USC 1131–1136)).

DESIGNATED WILDERNESS IN DENALI NATIONAL PARK

The majority of the land in Denali satisfies the criteria of this wilderness definition even though much of the land has not yet been officially designated as wilderness. ANILCA of 1980 tripled the size of the park, designated much of it as wilderness, and called for the Secretary of the Interior to assess the suitability of other lands for subsequent wilderness designation (NPS 1986).

More specifically, section 701 of ANILCA formally designated roughly 99% of the former Mount McKinley National Park as wilderness to be managed in accordance with the Wilderness Act of 1964. Various wilderness use provisions were also set forth via ANILCA (e.g., use of snowmachines, motorboats, and airplanes for traditional activities or subsistence). With the exception of the last few miles of the Park Road near its terminus in Kantishna, the entire Park Road corridor runs through this designated Denali wilderness. However, since the uses of the road do not comply with wilderness management criteria, the road itself and buffers on each side of it were excluded from the designated wilderness lands.

The designated wilderness boundary along the Park Road corridor begins 150 feet from the centerline of the Park Road (measured perpendicularly from the centerline on both sides of the road). The boundary also begins 150 feet from any existing borrow pits and waysides; lands east of the railroad right-of-way are excluded from designation (NPS 1986). Typically, a 300-foot buffer separates the wilderness boundary from any park facility or development.

Therefore, although the activities and disturbances on the Park Road do not occur on designated wilderness lands, the wilderness may be affected by road corridor use given its immediate proximity to wilderness. Some of these effects could include, but are not limited to, noise from motorized vehicles, human voices, fugitive dust, obstructed viewsheds (e.g., vehicles or road in viewsheds), social trails, vegetation trampling near transportation hubs (from people who wander beyond the facilities), or increased signs or facility development near

hubs. Thus, the volume, timing, and type of vehicle use on the Park Road and the location, size, and use levels of transportation nodes may affect wilderness character in the park.

Since wilderness character is also defined by the opportunity for solitude, and since the park's wilderness is close to the Park Road, the mere presence of other humans along the Park Road could affect the wilderness character in the park. Whether these other visitors travel by foot, bicycle, personal motorized vehicle, or visitor buses, their presence (and their ability to access areas deep inside the park via the Park Road) could detract from the opportunity to experience solitude.

In addition to the wilderness areas along the Park Road corridor (and beyond the boundaries of the former Mount McKinley National Park), Denali National Park and Preserve includes millions of acres of land that are not yet designated wilderness, but are managed for wilderness values. Activities along the Park Road do not affect most of these other lands. The legal and administrative status of these lands was established by section 1317 of ANILCA, which required the Secretary of the Interior to conduct a wilderness suitability review for the lands added to the park under ANILCA.

This review was included in the 1986 general management plan. The review concluded that approximately 3.73 million additional acres of the nondesignated lands in the park were suitable for wilderness designation. An area within the Kantishna Hills was determined to be unsuitable for designation as wilderness because of persistent disturbance caused by past mining activity. Since that determination, many of the private inholdings have been acquired, and much of this land has been restored; these lands now share similar values with the rest of the park additions.

NPS policy and the park's current *Backcountry Management Plan* call for the wilderness values of these lands to be preserved, pending future action by the Secretary of the Interior, President, and Congress (NPS 2006b).

Working from the wilderness definition that was established by the Wilderness Act of 1964, the *Denali Backcountry Management Plan* sets forth several criteria that guide how the wilderness values in the park will be managed and preserved (NPS 2006b). Designated wilderness lands and recommended lands at Denali, including the areas beyond 150 feet of the Park Road centerline, are managed in a way that protects wilderness character.

WILDERNESS CHARACTER

Wilderness character is not specifically defined in the 1964 Wilderness Act, nor is its meaning discussed in the act's legislative history. However, the Wilderness Act identifies the following qualities that unify wilderness areas regardless of their size, location, or any other feature. The four qualities of wilderness character are:

Undeveloped – "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation . . .." This refers to areas that are essentially without permanent structures, enhancements, or modern human occupation. To retain its primitive character, a wilderness ideally is managed without the use of motorized equipment or mechanical transport.

Natural – "protected and managed so as to preserve its natural conditions . . .." This means areas that are largely free from the effects of modern civilization. It also refers to maintenance of natural ecological relationships and processes, continued existence of native wildlife and plants in largely natural conditions, and absence of distractions (e.g., large groups of people; mechanization; and evidence of human manipulation, unnatural noises, signs, and other modern artifacts).

Untrammeled – "an area where the earth and its community of life are untrammeled by man" and "generally appears to have been affected primarily by the forces of nature. . . ." This refers to ecosystems that are unhindered and free from human control or manipulation. In other words, this wilderness quality can be degraded by human actions that control or manipulate components or processes of ecological systems within the wilderness area.

Outstanding Opportunities for Solitude or Unconfined Recreation – the area "has outstanding opportunities for solitude or a primitive and unconfined type of recreation . . .." Solitude means encountering few, if any, people, and experiencing privacy and isolation. Primitive and unconfined recreation refers to freedom to explore with few restrictions, and the ability to be spontaneous. It means self-sufficiency without support facilities or motorized transportation, and experiencing weather, terrain, and other aspects of the natural world with minimal shelter or assistance from devices of modern civilization.

The preservation of the above qualities of wilderness character is dependent on the management of the Park Road, particularly for wilderness areas that are immediately adjacent to the road corridor. Therefore, careful consideration to the effects on these qualities should be given when selecting appropriate vehicle management options.

PARK MANAGEMENT AND OPERATIONS

The park is staffed by approximately 377 employees, including seasonal employees but excluding vacancies that are organized into eight divisions. The divisions are the Superintendent's Office; Administration; Center for Resources, Science, and Learning (including the Interpretation Division); Visitor and Resource Protection; Commercial Services; Planning; and Maintenance. The staff is at the park's headquarters and, in summer, at various developed areas along the Park Road. In addition, nine permanent park staff are in Talkeetna, two are in Fairbanks, and one is in Anchorage. The park's budget for fiscal year 2010 was $32,864,000. This was a higher than normal budget due to a large volume of construction in the park.

SUPERINTENDENT'S OFFICE

The Superintendent's Office, based at the park headquarters, is staffed by eight individuals—the superintendent, two assistant superintendents, a public information officer, a seasonal public information officer assistant, two administrative assistants, and one safety officer. In addition to overseeing the day-to-day operations of the park, the Superintendent's Office facilitates dignitary visits, which include trips out on the Park Road. The office also coordinates ANILCA subsistence rights and land access assignments with inholders. The office oversees the permitting of commercial filming in the park. The division's main use of the road is for personal transportation and orientation trips for visiting dignitaries.

ADMINISTRATION DIVISION

The Administration Division is responsible for the park budget, fiscal and real property management, contracting, information technology (IT) services, and human resources. The division is staffed by 17 positions (13 permanent and 3 or 4 seasonal positions)—a chief of administration, a supervisory IT specialist, 2 IT specialists, a seasonal IT specialist, 2 human relation specialists, a program analyst, a Volunteers-in-Park coordinator, 2 budget specialists, and 6 administrative assistants. The division has no specific duties relating to the road, other than using it for travel within the park and to support the other divisions. The IT staff regularly provide support services to the Eielson Visitor Center and Toklat.

CENTER FOR RESOURCES, SCIENCE, AND LEARNING

The Center for Resources, Science, and Learning is responsible for natural and cultural resource management, fire management, aviation, scientific research, and interpretation carried out in the park and regionally. The center is staffed by 29 permanent and 27 seasonal positions, which include physical, cultural, and biological resource specialists, fire specialists, and a social scientist. Along the Park Road, the center conducts natural resource monitoring and field research. The center also responds to wildfires and conducts hazard fuel treatments in developed areas and around historic structures; maintains aviation facilities; and coordinates field trips, education, and public outreach. The center oversees agreements with the state of Alaska regarding access to impaired waterways, fire management, sport hunting, fishing and trapping in the preserve, and access to earthquake monitoring seismometers. The center coordinates with the Bureau of Land Management in regional fire plans, the U.S. Geological Survey for access to research sites, and private individuals regarding access for Kantishna and subsistence hunting and gathering uses.

Operating under the Center for Resources, Science, and Learning as a separate work group, the Interpretation Division prepares interpretive programs and interpretive materials in a variety of media that are distributed along the road at developed areas. The division (referring to interpretation) is staffed by 53 positions consisting of 8 permanent, 5 term, 29 to 34 seasonal (seasonal staffing figures vary annually according to budget), 6 interns, and 1 intermittent position. Interpretive staff are at park headquarters, the park's entrance area, Toklat, Wonder Lake, and Talkeetna. The division coordinates special programs such as the Artist-in-Residence Program and Teacher-to-Ranger-to-Teacher Program, develops and maintains two visitor centers, runs the Murie Science and Learning Center, runs the Toklat visitor contact station, runs the park kennels operation, and maintains wayside exhibits, as well as a wide range of daily interpretive services. The division works with inholders and special interest groups to provide guided hikes and tours of park resources.

Park interpreters use the Park Road extensively in providing the afore-mentioned services and in making interpretive visitor contacts. Approximately 17.5 full-time equivalent positions are expended on road-related activities or working with visitors who use the road to visit the park (one full-time equivalent position represents a full year of work, whether performed by one full-time employee or multiple part-time employees). The division has agreements with the University of Alaska Fairbanks, Alaska Geographic, Denali Borough School District, and Denali Education Center for educational programs and has a memorandum of understanding with the Central Michigan University for a photojournalism intern. The division also has an agreement with Joint Venture, the park's primary concessioner, to provide an interpretive program for the Kantishna Experience. The park also has an agreement with Princess Cruise Line and Holland America Line to provide support for programming (e.g., rangers on the train and the Denali Visitor Center auditorium). Interpretive staff also provide training, coaching, and program evaluation to primary partners who provide in-park services.

VISITOR AND RESOURCE PROTECTION DIVISION

The Visitor and Resource Protection Division is at park headquarters, with rangers stationed at various developed areas along the road, including Talkeetna. The division is staffed by 27 positions (18 full-time, 6 seasonal, and 3 temporary or term) with responsibilities that include law enforcement, traffic enforcement, motor vehicle accident investigations, emergency medical services, search and rescue, wildlife management, wilderness management, administration of special park uses and right-of-way permits, and subsistence management. Of the 27 positions, approximately 4 full-time equivalent positions are dedicated to activities along the road. Approximately 20% of the division's annual funding was directed toward services along the road. The division has a memorandum of understanding with Alaska State Troopers to provide law enforcement services on nonfederal lands in Kantishna. The division also manages right-of-way permits for 15 inholders in Kantishna and oversees a special agreement with Professional Photographers (a NPS program designed to promote visitation to parks by allowing photographs to be taken for commercial use).

COMMERCIAL SERVICES DIVISION

Based at the park's headquarters, this division is staffed by a chief of commercial services, three concession management specialists, one supervisory revenue and fee business manager, and nine seasonal visitor use assistants. The Commercial Services Division bears the primary responsibility for the transportation system. The division manages a category I contract (DENA003-01) that authorizes Doyon/ARAMARK Joint Venture to operate in the park. This responsibility

entails ensuring that the concessioner adheres to the requirements in the contract. The requirements are many and include responsibilities such as bus replacement, preventive maintenance protocols and documentation, driver training, bus cleanliness, adherence to Department of Transportation regulations, break-down and repair documentation, pretrip inspections by drivers, and documentation. The division approves all ticket pricing on an annual basis, and NPS staff work intimately with concession managers to develop schedules for the shuttle bus portion of the contract. The division interacts with Joint Venture managers and other staff on a nearly daily basis during the busy operating season, and regularly communicate during the balance of the year. The division dedicates approximately 1.5 full-time equivalent possitions and 24% of the division's annual budget to these oversight duties. In addition to the transportation contract, the division oversees 18 special use contracts such as mountain guides, air taxi, interpretive guided hiking, sport hunting, dog sled passenger, dog sled freight, and approximately 50 commercial use authorizations.

PLANNING DIVISION

The Planning Division is distributed among three duty stations—park headquarters, the Talkeetna ranger station, and the Alaska Regional Office in Anchorage. Staffed by a chief of planning, two environmental protection specialists, and one seasonal planning assistant, the division is responsible for planning, environmental compliance, and plan implementation (such as coordinating a Federal Advisory Commission Act group that looks at aviation impacts on the natural soundscape). Compliance with national environmental protection laws is a major emphasis for the division. The division also ensures mitigation measures are carried out on construction projects. Approximately two full-time equivalent positions are dedicated to the current vehicle management plan.

MAINTENANCE DIVISION

The Maintenance Division is the largest division in the park. The division is staffed by 35 permanent, 13 term, 138 seasonal, and 14 intern positions having responsibilities relating to engineering, administration, roads, trails, buildings and utilities, and the auto shop. Approximately 65% of the division budget is directed to road activities. The chief of maintenance and most roads, trails, engineering, auto shop, and building and utilities staff are in a separate area near park headquarters. Other maintenance staff are at Toklat, Eielson, and Wonder Lake. The division is responsible for maintaining reliable access in the park for visitors, inholders, emergency vehicles, and park staff. The division also carries out routine maintenance such as replenishment of road surfacing materials, brush cutting and shoulder maintenance, rockfall and mudslide removal, trash pickup, fuel delivery, and restroom maintenance.

Through special project funds, the division has overseen the rehabilitation construction of historic patrol cabins and construction of Sweet Smelling Toilets, bus shelters, and other structures along the road. Nonroad-related duties include trail planning, construction, and maintenance; condition assessments; Occupational Safety and Health Administration and construction inspections; maintenance of the park headquarters, visitor centers, and other buildings; vehicle and equipment maintenance and repair; maintenance of the photovoltaic system at Eielson; engineering studies and energy audits; supervision of work crews; and support of park emergencies and search and rescue operations.

The division has an agreement with the Alaska Department of Transportation for maintaining the Kantishna portion of the road, and works cooperatively with Alaska Department of Transportation staff in maintaining the Kantishna airstrip. The division has agreements with special interest

groups and nonprofit groups for snow plowing and road maintenance, maintenance of portable toilets at Kantishna Airstrip and East Fork Cabin, and maintaining the Toklat River Visitor Center bookstore.

SOCIOECONOMICS

INTRODUCTION

The opening of the George Parks Highway in 1972 dramatically improved vehicular access to the park, which in turn triggered strong growth in visitor use. Between 1972 and 1984, annual visitation to Denali climbed by nearly 350%, to 395,099. Historically, as well as currently, the overwhelming majority of visitor use is associated with the Denali entrance area and the Park Road corridor into the interior of the original Mount McKinley National Park. The first exposure to the park for many visitors, however, would be views of the Alaska Range and Mount McKinley as they travel northward on the Alaska Railroad or along the George Parks Highway. The southern expansion of Denali created an opportunity to strategically plan for expanded and diversified visitor use while concurrently protecting significant resource values in the Park Road corridor.

This section addresses baseline socioeconomic conditions for the planning area potentially affected by the preferred alternative vehicle management plan for the northern portion of the Park Road. For purposes of this assessment, the planning area encompasses in-park concessions, private enterprises operating within inholdings in the park, the Denali Borough[1] (as a governmental entity), and the "communities" in the Denali Borough. These communities include Healy (the borough seat), McKinley Village, and Nenana Canyon[2], all of which are unincorporated and collectively serve as a "gateway" to the northern portion of the park (see figure 21). Denali Borough covers approximately 12,750 square miles of land area, including most of its land area within Denali (U.S. Census Bureau 2010a). Other communities in the borough include Cantwell, Ferry, and Anderson. The Clear Air Force Station is within the boundaries of Anderson. Cantwell is approximately 27 miles south of the Park Road, near the borough's southern boundary; the other three communities are north of the Park Road—Ferry is 22 miles north and Anderson is 53 miles north.

Denali Borough was formed in 1990. It is bordered by the Matanuska-Susitna Borough to the south and to the east, west, and along most of its northern border by areas that are not currently part of an "organized" borough. The Fairbanks-North Star Borough abuts the Denali Borough along the remainder of its northern border (see figure 21).

Fairbanks, the nearest regional trade and service center, is approximately 110 miles north of the park on the George Parks Highway. Talkeetna, which serves as a base for mountain climbing, backcountry use, and air taxi/scenic flight tours in the southern portion of the park, is roughly 125 miles south of park headquarters. Anchorage, Alaska's largest city is about 240 miles to the south.

[1] Boroughs and cities are the two types of municipal government in Alaska. Although both types of municipalities can exercise similar powers and duties, a fundamental difference is that cities are community-based, while boroughs are regionally based. Denali Borough is one of 18 organized boroughs in Alaska, each having boundaries generally conforming to natural geographic boundaries/features and embracing areas and resident populations with common interests. Organized boroughs encompass less than half of the state's total geographic area, virtually all of the remaining area being located in a single unorganized borough (Alaska Department of Community, Commerce, and Economic Development (DCED) 2000). Boroughs are reasonably analogous to county governments in the lower 48 states.

[2] Nenana Canyon refers to an area of lodging and retail development east of the Nenana River, just to the north of the main entrance road to the park along the George Parks Highway (a nationally designated scenic byway).

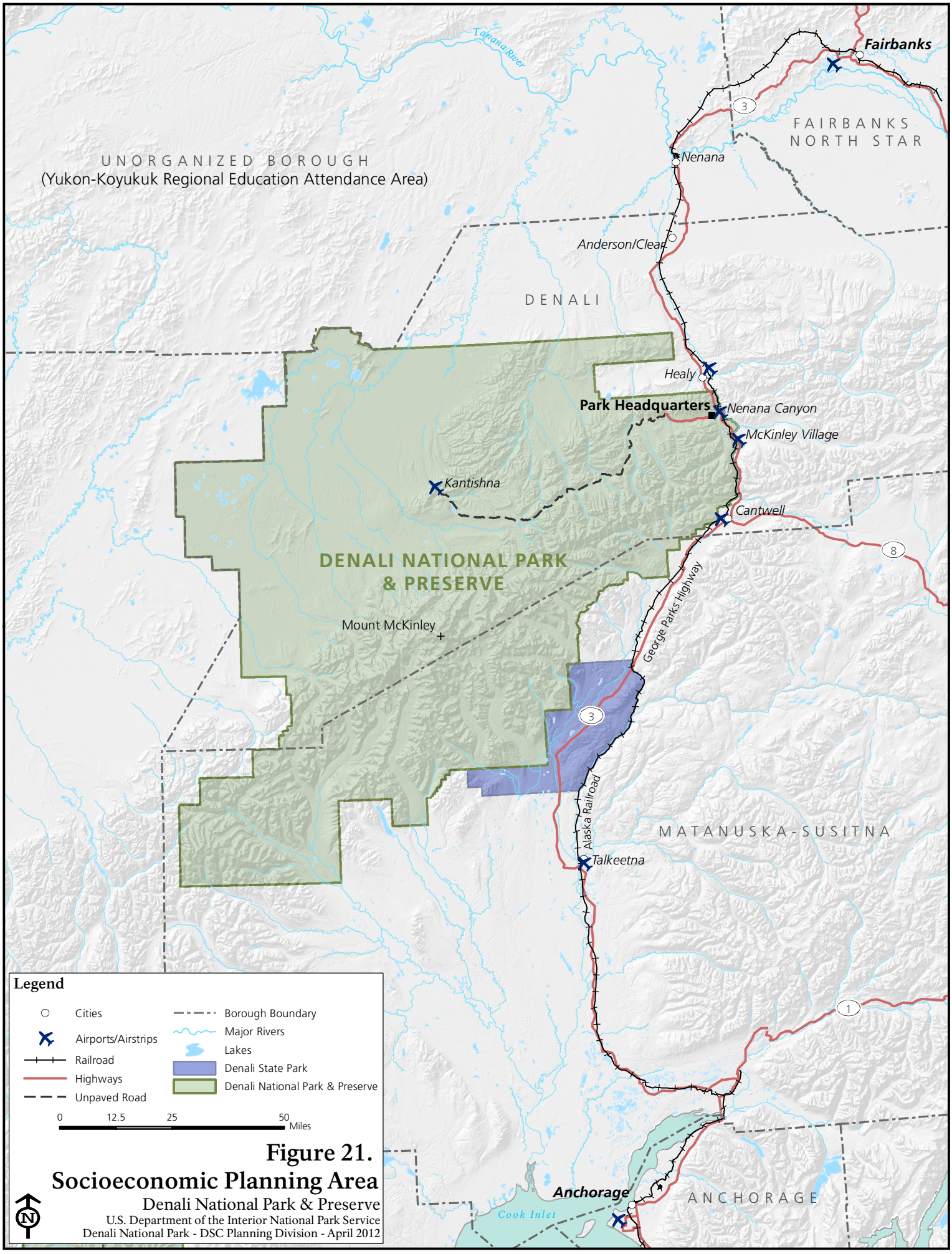


Figure 21.
Socioeconomic Planning Area
Denali National Park & Preserve
U.S. Department of the Interior National Park Service
Denali National Park - DSC Planning Division - April 2012

Baseline conditions addressed in this section include the regional economy (employment, labor force, unemployment, major employers, and the role of tourism and park operations); population; and selected community services and fiscal links between the park and communities.

REGIONAL ECONOMY

The borough's economy is comprised of several key employers that combine to create a fairly stable and diverse foundation, coupled with travel and tourism activity driven by the strong seasonal influence of the park. Changes in the total employment in the borough mirror changes in the travel and tourism-related employment, which in turn generally coincides with park visitation. Thus, employment increased from 2003 through 2006, stabilized in 2007 and 2008, then declined sharply in 2009 in concert with the 17% decrease in total recreational visitation to the park.

The key employers responsible for the stable economic base include the Usibelli coal mine (a coal-fired generating plant operated by the Golden Valley Electrical Association), the Clear Air Force Station, the Park Service, and state and local government and public education agencies. Together, these entities support year-round employment for about 1,000 residents of the borough, Fairbanks, and other nearby areas.

Superimposed on the year-round employment is a strong seasonal employment effect created by park operations, including concession activities in the park and the myriad of activities associated with visitor services outside the park. Within the park, the Park Service maintains approximately 125 permanent and term positions, adding approximately another 250 seasonal and temporary jobs during the summer visitor season (May through September). The Kantishna Roadhouse, Denali Backcountry Lodge, and jointly owned and operated Camp Denali and North Face lodges are on private inholdings approximately 90 miles from the Denali Visitor Center. These facilities operate seasonally and collectively employ approximately 150 people. In addition, concession operations employ 300 to 350 individuals to operate the park's bus transit system (including the Wilderness Access Center), in-park food service, and Riley Creek and Savage River campgrounds. Alaska Geographic, an official partner of the national parks in Alaska, staffs and operates retail outlets selling books, educational materials, pictures, and other miscellaneous merchandise at the Denali Visitor Center campus and the Toklat River contact station / rest area (mile 53 of the Park Road).

Business establishments catering to the market demands associated with park visitors, temporary employees, and to a lesser extent, needs associated with commercial and leisure traffic along the George Parks Highway, create a similar, even more pronounced seasonal economic expansion outside the park, particularly in the "gateway" area. The hospitality and retail establishments in the gateway include six major corporate-owned lodges or hotels[1]; several smaller motels, bed and breakfasts, RV parks, and rental cabin operations; numerous restaurants, coffee shops, and fast food outlets; and miscellaneous apparel, souvenir, and convenience stores. A variety of recreation outfitters, guides, and service establishments are also in the area, offering guided fishing, hiking, rafting, and jeep tours; motorcycle and trail bike rentals; horseback riding; and other outdoor activities.

Scenic air tour and air taxi operators flying from airstrips and airports in and near the park offer visitors a unique Denali experience, providing opportunities for "flightseeing" tours over the park and around Mount McKinley, glacier landings, access to the Kantishna area, and mountain climbing and

[1] Several of the lodges and hotels are under common ownership and management.

backcountry camping. Air tour and air taxi flights in the northern area operate from the McKinley Park airstrip in the park and airstrips near Kantishna, Healy, and McKinley Village. However, capitalizing on advantages afforded by proximity to Anchorage and Mount McKinley, flight services based in Talkeetna carry the majority of the passengers on flights into and over the park. Several of the Talkeetna-based operators have affiliates serving the northern areas of the park.

The lodges and other tourism-related business establishments typically staff up, open in mid-May, and close shortly after Labor Day. The majority of employees of these establishments are seasonal migrants from the "lower 48," some of whom return year after year.

Transportation is yet another dimension of the seasonal economy workforce. Although independent travelers represent an estimated 45% of all visitors to the park, 55% arrive as part of package tour, typically involving a cruise as part of the larger itinerary. Travel from the port to the park is via a scenic rail journey on the Alaska Railroad, motor coach tour, or rental vehicle, creating yet additional seasonal jobs. Although most of the employees affiliated with these jobs are based elsewhere, they contribute to the seasonal expansion of employment in the region.

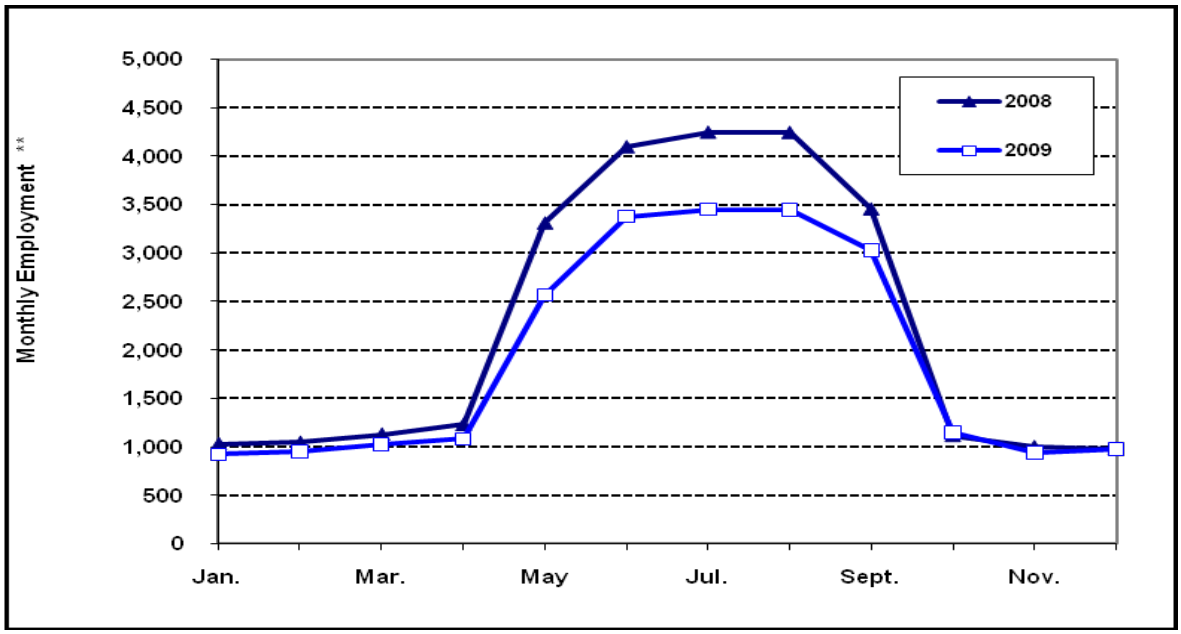
The net result of the seasonal visitation to the park, increase in park staffing, and tourism and other traffic on the George Parks Highway is a dramatic and pronounced 250% to 300% increase in employment in Denali Borough during June, July, and August (see figure 22). Figure 22 also highlights the sharp year-to-year decline of approximately 750 jobs between 2008 and 2009 that occurred in conjunction with a decline in total recreation visitor use at the park.

A corollary to the seasonal spike in employment is a seasonal decline in unemployment among residents. Data for calendar year 2009 reported that local unemployment declined from approximately 175 to 180 in the winter to a low of 80 to 90 during the summer (Alaska Department of Labor and Workforce Development (DLWD) 2010). In fact, anecdotal information suggests that a number of residents work full-time during the tourism season as their primary means of economic support, saving a portion of their earnings and then seeking part-time work or choosing to not work the remainder of the year.

More than 75% of the seasonal employment gains are concentrated in the overnight accommodations and food service industries, with those gains further concentrated in the large hotels and motels in Nenana Canyon and McKinley Village that collectively serve the visitors to Denali who spend one or more nights in the area. Marked seasonal employment gains also occur in transportation, retail trade, and federal employment, again tied to demands associated with tourists (see figure 23).

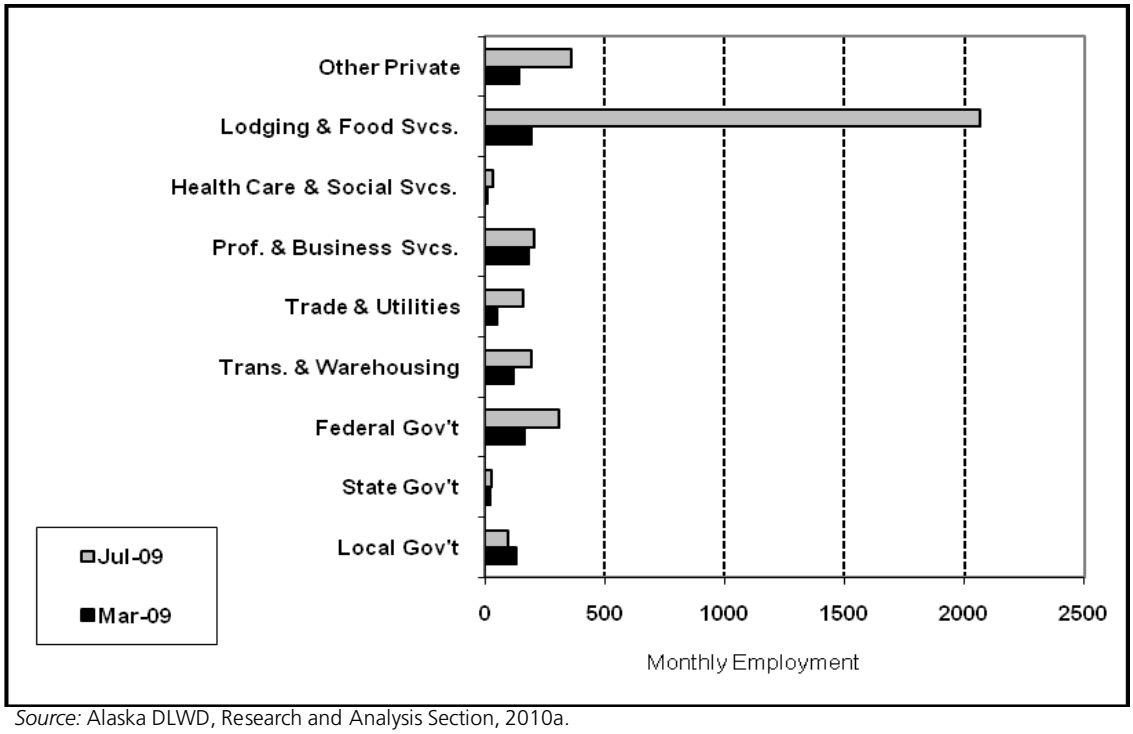
Of particular relevance to this analysis is the seasonal transportation concession operating in the park. The concession, operated by the Doyon/ARAMARK Joint Venture, consists of a staff of approximately 300 to 350 bus drivers and mechanics; sales and support staff at the Wilderness Access Center; and other support staff associated with employee housing and dining, maintenance facilities, and offices. The bus system is inextricably linked to visitor use and the local tourism economy, as it offers the sole means of access into the interior of the park for the overwhelming majority of all visitors. The annual bus ridership of 304,676 and 260,594 in 2008 and 2009, respectively, represented more than 70% of the total annual recreation visitation.

Figure 22. Monthly Employment in Denali Borough, 2008 and 2009



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section, 2010a.
** Excludes self-employed, fishers, domestic workers, unpaid family workers, and nonprofit volunteers.

Figure 23. Employment in Denali Borough, in March and July 2009, by Major Industry



Source: Alaska DLWD, Research and Analysis Section, 2010a.

The four private lodges in the Kantishna area operate private shuttles that carried 21,797 and 15,894 guests and staff in 2008 and 2009, respectively (NPS 2010b).

Amplifying the critical role served by the park's bus transit system for the recreation visitor is the understanding of the importance of the Denali excursion for Alaska's $3.0+ billion (estimated total economic impact) summer tourism industry. Even as the number of destinations, attractions, and "add-ons" offered to cruise guests has increased over time, a visit to Denali ranks as one of the primary attractions or destinations among tourists to Alaska, particularly for the cruise industry (Alaska Department of Community, Commerce, and Economic Development (DCED) 2007, 2010). The strong ties between Denali and the tour cruise industry is evident in the correlation between summer passenger capacity provided by the cruise lines; the capacity and schedules of passenger rail and bus service connecting Anchorage, Denali, and Fairbanks; the capital investment in lodging infrastructure in Nenana Canyon and McKinley Village; and ridership on the park's bus transit system. Due to these interdependencies, the economic links tied to recreation visitor use at Denali extend beyond those evident in the Nenana Canyon and elsewhere in Denali Borough to more distant communities including Anchorage, Fairbanks, Seward, and Whittier.

A recent study of the impact of visitor spending on the local economy associated with Denali estimated total direct spending of approximately $107 million in the Denali region in 2008, not including the base outlays for cruises or airfares to and from Alaska. That total includes $52 million for overnight lodging, $24 million in restaurants and bars, $25 million on scenic tours and local transportation, and $6 million for miscellaneous goods and services. In addition, approximately $34 million in spending by those visitors was on rail, bus, air transportation, and vehicle rental expenses in Alaska that accrued outside the local economy (Stynes and Ackerman 2010).

Talkeetna, which serves as the southern gateway to the park, captures a portion of the park-related visitor spending. Some of that spending results from day visits emanating from the Anchorage area, the principal purpose of which is experiencing the views of the Alaska Range and Mount McKinley. Additional spending is derived with mountaineering activity focused on Mount McKinley; other nearby destinations use Talkeetna as a base, supported by park staff at the Talkeetna ranger station. As described above, several scenic air tour and air taxi operations are based in Talkeetna. The Alaska Railroad serves Talkeetna, offering passenger service on the Anchorage-Denali-Fairbanks route. While visitor use and spending in the Talkeetna area is low compared to what occurs in the northern portion of the park, both are expected to increase over time as the *South Denali Implementation Plan* (NPS 2006c) progresses.

In general, residents of the Denali Borough benefit from favorable economic circumstances that provide them with relatively high personal income. This is due to the combination of the many year-round jobs in mining, government, and utilities, combined with the economic stimulus associated with the strong seasonal economy. Local private and public sector employers paid $121.6 million in wages, salaries, and proprietor earnings in 2008. However, $42.4 million of that total (35%) was paid to nonresidents of the Denali Borough, presumably temporary seasonal workers. Adding in interest, dividends and other sources of nonlabor income yielded total personal income of $96.8 million for the borough's residents, or $53,131 per capita. The comparable personal income measures for the state and nation were $43,922 and $40,416, respectively (U.S. Bureau of Economic Analysis 2010).

In 2008, just 5.4% of the borough's residents were estimated to live at or below the federal poverty thresholds, substantially lower than the corresponding 9.2% across the state and 13.2% of the nation's population that were living in poverty. As with per capita personal income, the median household income for Denali Borough residents was substantially higher than the corresponding statewide or national norms—$ 70,720, $67,332, and $52,029, respectively, albeit unadjusted to reflect differences in the cost of living (U.S. Census Bureau 2009).

POPULATION AND DEMOGRAPHICS

The year-round resident population of the Denali Borough, estimated at 1,851 in 2009, has been stable over the past decade, ranging between 1,805 (2007) and 1,896 (2004) (U.S. Census Bureau 2010b). The overwhelming majority of the borough's residents live along the George Parks Highway corridor. Healy, with approximately 1,000 permanent residents, is the borough's largest community. The estimated populations of the other communities include Anderson: 275, including personnel and dependents assigned to the Clear Air Force Station; McKinley Park: 168; Cantwell: 200; and Ferry: 36 (Alaska DCED 2010).

Population in the Denali Borough, like employment, has a strong seasonal component associated with visitation to Denali. During the summer season, visitors to the area staying overnight in the 3,300 hotel and motel rooms, cabins, and RV/tent camping sites in the area can add upward of 7,500 individuals to the area's population (Denali Borough 2009; Alaska DLWD 2010). Seasonal employees add as many as 3,500 additional temporary residents. Many of the latter are housed in employer-provided dormitories, cabins, and apartments. When these temporary population groups are considered, the borough's effective service population rises to approximately 13,000 during the peak season.

Demographic characteristics of the borough's resident population indicate a median age near 40, more than 6 years older than the statewide average. The difference is attributed to a large number of baby boomers (ages 44 to 62), which is also associated with fewer and older children. Compared to the state as whole, the borough's population is comprised of more men than women. The borough's population is less racially diverse than that of the state with whites accounting for 87% of the borough's residents in 2006 compared to 72% across Alaska. Native Americans were 9% of the borough's residents, approximately half the corresponding share statewide (Alaska DLWD 2009).

Available information indicates the following characteristics for the seasonally employed workforce:

- As many as 10% come from the ranks of the unemployed/underemployed residents in Denali Borough, or individuals who join the labor force seasonally.
- Approximately 25% are residents from other locales in Alaska.
- The remainder are from the lower 48 states or are international guest workers, many of whom come from eastern Europe.
- Many, if not the majority, are college-aged and are not married.

PUBLIC FACILITIES AND SERVICES AND LOCAL GOVERNANCE

Denali Borough is a home-rule borough. This form of local governance provides broad authority with respect to services provided. The borough presently exercises statutorily required planning and taxation authority and provides for public education. It also provides for solid waste management under the discretionary authority granted to home-rule boroughs. Planning, taxation, and finance are

provided through the borough's administration functions, housed in Healy.

The borough's annual operating expenditures budget was $2.9 million in fiscal year 2009, with $3.3 million budgeted for fiscal year 2010 expenditures. The adopted budget for fiscal year 2011 was $4.1 million. Borough administration, which encompasses the assembly, mayor's office, and planning commission functions, accounts for approximately $1 million in budgeted expenditures. Current expenditures exclude a substantial contingency reserve established in recent years by the borough, setting aside surplus revenues during periods of favorable fiscal conditions (Denali Borough 2009, 2010).

Outlays to support public education average about $1.7 million annually, accounting for the borough's largest category of expenditures. The Denali Borough School District operates three "brick and mortar" schools, one each in Anderson, Healy, and Cantwell, using advanced technology and distance learning to provide students access to educational options not typically available in smaller rural schools. The district also operates Denali PEAK, a statewide correspondence/home school program using online curriculum and computer technology to support families choosing to educate their children at home. The district is among the largest employers in Denali Borough.

Overnight accommodations tax receipts (commonly known as the bed tax), derived from a locally imposed 7.0% tax levy, are the single largest revenue source for the borough. In fiscal year 2009, the borough derived more than $2.7 million in revenue from this source. The borough was anticipating lower bed tax receipts in 2010 because these revenues are sensitive to the levels of overnight tourist visitation and the average overnight lodging rates, both of which were expected to be lower due to the effects of the economic recession on travel and tourism. Denali Borough levies neither a general sales tax nor an ad valorem/property tax. Consequently, the borough realizes no tax receipts from visitor purchases of merchandise, food, and beverages, or from the residential, industrial, or commercial development in the borough, the latter including the hotels and retail developments in Nenana Canyon and McKinley Village (Denali Borough 2009, 2010; Talerico 2010).

Intergovernmental revenue from the federal and state governments account for most of the borough's remaining revenue. Such revenues include basic revenue sharing from the state and the borough's share of a statewide tax on electrical and telephone co-ops. Payments-in-lieu-of-taxes from the federal government, based primarily on the location of most of Denali within the borough's boundaries are another major source of operating funds for the borough. Locally derived revenues include a severance tax on produced minerals, gravel and coal, and tipping fees at its landfill. The latter cover a substantial portion of the direct operating costs, but are insufficient to cover equipment replacement, repairs, and expansion and closure contingency funds.

The borough operates a single landfill, located near Anderson in the northern portion of the borough. The landfill operates on an enterprise basis, serving the general waste disposal needs of households, hotels, campgrounds, employee housing, and the park. A transfer station serving the southern portion of the borough is in Cantwell. A locally based licensed solid waste disposal company provides contract pickup and disposal service for households and local businesses. Opened in 1997 with an expected life of 30 years, the landfill has experienced higher than anticipated fill rates, triggering efforts by the borough to consider a Phase II expansion adjacent to the current site (Talerico 2010).

In addition to services provided directly, Denali Borough provides discretionary funding support to locally based nonprofit organizations, libraries, fire protection, and emergency medical services (EMS) entities.

The Tri-Valley Volunteer Fire Department (Tri-Valley VFD), based in Healy, is a frequent recipient of such funds. One of four such departments in the borough, the Tri-Valley VFD provides coverage for structural and wildland fire suppression, emergency medical response, and initial patient transportation in Healy, Nenana Canyon, and along the section of the George Parks Highway midway between McKinley Village on the south and mile 274 (about 26 miles north of Healy) on the north. The Tri-Valley VFD provides support coverage in the frontcountry area of the park under a cooperative agreement with the Park Service. Seasonal demands associated with the large number of visitors to the park and highway accidents on the George Parks Highway comprise the largest share of calls for service received by the Tri-Valley VFD. The Tri-Valley VFD coordinates with air-based medivac service providers to transport seriously ill or injured patients to Fairbanks (Talerico 2010).

The McKinley Village Volunteer Fire Department is responsible for initial fire suppression in the McKinley Village area and supports the Tri-Valley VFD on structural fire response calls in the Nenana Canyon area.



Chapter 4
Environmental Consequences

INTRODUCTION

This chapter presents the analysis of impacts that would result from implementing any of the alternatives considered in this plan / environmental impact statement. The terms "impact" and "effect" are used interchangeably throughout this document.

The impact topics presented in this chapter and the organization of the topics correspond to the resource discussions contained in "Chapter 3: Affected Environment." This chapter includes information on the general methodology and assumptions for analyzing impacts, the analysis methods used for determining cumulative impacts, and definitions of impact thresholds (minor, moderate, and major) for each impact topic. As required by CEQ regulations implementing the National Environmental Policy Act, a summary of the environmental consequences for each alternative is provided in table 3 which can be found in "Chapter 2: Alternatives."

GENERAL METHODOLOGY AND ASSUMPTIONS FOR ANALYZING IMPACTS

The planning team based the impact analysis and the conclusions in this chapter on the review of existing literature and studies, information provided by experts in the Park Service, park staff insights, public scoping, and professional judgment. The analysis includes an assessment of both direct and indirect impacts. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or are farther removed from the place, but are still reasonably foreseeable. All of the impacts have been assessed assuming that mitigative measures described in chapter 2 have been implemented to minimize or avoid impacts.

DO-12: *Conservation Planning, Environmental Impact Analysis, and Decision Making* presents the approach used to identify the geographic context; duration (short- or long-term); intensity or magnitude (minor, moderate, or major); and type (adverse or beneficial) of the impacts. Assumptions used when considering impacts are explained further in this section.

Some sections of this chapter reference modeling results. A traffic simulation model was developed to test bus schedules to meet indicators and standards. The model was also used to compare seasonal bus numbers and seat availability between and among the no-action and action alternatives. Appendix D presents a summary of the results of this traffic modeling.

Geographic Context

Because the alternatives in this plan / environmental impact statement relate to the management of vehicles along the Park Road, the area of analysis for direct and indirect effects is generally limited to those resources within or near the road corridor. As a result, the following terms were generally used when describing the geographic context of the effects for all impact topics except socioeconomics.

Local Impacts. For most impact topics, effects would occur along the Park Road corridor or in the immediate vicinity of the corridor. In the analysis of socioeconomics, local effects would occur in the area within Denali Borough near the northern portion of the park, including the communities of Healy, McKinley Village, and Nenana Canyon.

Regionwide or Parkwide Impacts. These effects would occur beyond the vicinity of the Park Road corridor and would extend to areas throughout or beyond the park. In the analysis

of socioeconomics, effects would occur over a broader geographic region, extending to other communities of the Denali Borough such as Cantwell, Ferry, and Anderson. Effects could extend beyond the Denali Borough to other areas of central and southern Alaska, including Fairbanks and Anchorage.

Duration

As described in chapter 2, aspects of the transportation system would be monitored during the visitation season relative to the indicators and standards identified in this plan / environmental impact statement. Should monitoring show that a standard is exceeded, further changes to the transportation system would be made. Therefore, impacts could occur during the initial implementation of the plan or several years after, and would be identified by monitoring. The following definitions were used for duration of an impact.

Short-term Impacts. Short-term impacts are effects that last for up to two consecutive visitation seasons (or years). Because of the potential for adaptively managing the transportation system, short-term impacts could occur at multiple points during the life of the plan.

Long-term Impacts. Long-term impacts are effects that last for more than two consecutive visitation seasons (or years).

In the analysis of socioeconomic impacts, a slightly different definition is used: short-term impacts are considered to last up to five years, and long-term impacts last more than five years. This timeframe better captures general timeframes of socioeconomic conditions in response to changes in management actions.

Intensity

Determining impact thresholds is a key component in applying NPS *Management Policies 2006* and DO-12. These thresholds provide an idea of the intensity of a given impact on a specific topic. Because the intensity of impacts varies by resource, definitions of these are provided separately with each impact topic analyzed in this document.

Type of Impact

The following definitions of an adverse and beneficial impact were used in the analysis.

Adverse. Adverse effects are those effects that reduce the quality of, degrade, or diminish the visitor experience, transportation system, park resources (e.g., wildlife or wilderness), park management and operations, or the social and economic environment.

Beneficial. Beneficial effects are those effects that improve or enhance the visitor experience, transportation system, park resources (e.g., wildlife or wilderness), park management and operations, or the social and economic environment.

CUMULATIVE IMPACTS ANALYSIS METHOD

CEQ regulations for the implementation of the National Environmental Policy Act require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no-action alternative.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans at Denali and, if applicable, the surrounding area. Table 18 summarizes the actions that could affect the various resources at the park that might also be affected by vehicle management.

Table 18. Cumulative Impacts Scenario

Type of Action	Project	Description of Action	Status
Development	Development Concept Plan / Environmental Assessment for the Park Road Corridor (1983)	This plan described alternatives for upgrades of visitor and management facilities in the entrance area and along the Park Road corridor. A long list of projects was approved, including a visitor orientation center at the present Wilderness Access Center site. A decision was made to renovate the existing park hotel (a collection of railroad cars and modular units assembled on-site after the September 1972 fire that destroyed most of the original building). **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past
	Addendum to the 1983 Development Concept Plan / Environmental Assessment for the Park Road Corridor (1987)	This addendum proposed a new park hotel near the existing site within an "activity center" concept. Many structures and functions, such as visitor center, general store, post office, activity expediters, and sled dog demonstrations were to be given space surrounding the hotel. All tour and shuttle bus operations would be consolidated in the existing tour bus barn area behind the hotel. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past
	General Management Plan (1986 and subsequent amendments)	This plan provides comprehensive guidance for all aspects of park management. It creates park zones, identifies resource management needs, summarizes interpretive objectives and the desired visitor experience, identifies incompatible uses on inholdings, and determines the need and general locations for park development. Major concepts in the plan confirm the use of a limited access transportation system for the Park Road, set a goal to reduce private vehicular traffic, establish a maximum limit on vehicles, enact a "no formal trails" policy for the wilderness units, and create an objective to allow as many people as possible to view wildlife in the park. The plan generally adopted the development proposals of the preferred alternative in the 1983 development concept plan, although it did remove some roadside trails and campground expansion from the previous plan. The general management plan remained consistent with the previous plan in not advocating any overnight accommodations in the Wonder Lake area other than the campground. The plan concluded that major new commercial development or subdivision of land that would promote major land use changes would be an "incompatible use." Evaluation of alternatives for the park hotel was reserved for a public process in 1987. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing

Type of Action	Project	Description of Action	Status
Development (continued)	Entrance Area and Road Corridor Development Concept Plan (1997)	This general management plan amendment addressed Park Road management, visitor services and facilities, and administrative facilities in the park entrance area and along the road corridor to Kantishna. It specified allocations for the Park Road vehicle traffic; set out Park Road maintenance strategies including the preservation of road character; and planned for new visitor facilities including an east-end interpretive center, replacement of the Eielson Visitor Center, a new environmental education center, closure of the park hotel, and a new food service and gift shop facility. It also planned for administrative facilities including employee housing, a new EMS/fire station building, consolidation of maintenance facilities in the auto shop area, and a new administrative building in the headquarters area. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing
	South Denali Implementation Plan (2006)	This plan provides specific direction for expanded visitor facilities and recreational opportunities in the South Denali region until 2021. Proposed actions are guided by established laws and policies that affect the Park Service, State of Alaska, and Matanuska-Susitna Borough. Management actions prescribed by the plan should provide a quality visitor experience while protecting resource values in Denali National Park and Preserve, enhance recreational and access opportunities throughout the South Denali region for the benefit of a wide variety of visitors, and preserve the quality of life for residents in nearby communities. **Affected Resources:** visitor use and experience, wildlife and wildlife habitat, park management and operations, socioeconomics	Future
	Education Plan	The overall purpose of the Denali Education Plan is to communicate the park's long-term vision, key interpretive themes, educational priorities, and strategies that will help guide the park's educational program over the next several years. The plan also provides direction on the park efforts related to community outreach, training, evaluation, and the critical role of relationship building with park partners. **Affected Resources:** visitor use and experience, park management and operations	Ongoing
	Business Plan (2004)	The Denali Business Plan was created to communicate the financial status of the park to its stakeholders—a group principally comprised of the public, Congress, NPS employees, local communities, Native corporations, and park partners. The plan also provides park management staff with financial and operational baseline knowledge that will inform future decisions. The plan has three general components—a synopsis of the park's funding history, a detailed picture of the state of current park operations and funding, and an outline of park priorities and funding strategies. **Affected Resources:** visitor use and experience, transportation system and traffic, park management and operations, socioeconomics	Ongoing

Type of Action	Project	Description of Action	Status
Changes to Transportation System	Not applicable	In 1990, the park announced location changes for facilities proposed in the 1983 Development Concept Plan and 1987 addendum. The shuttle bus operations and maintenance facilities were proposed for relocation to the sewage treatment lagoons area. The post office, general store, and other camper conveniences were to be located near a new hostel close to a new loop in the Riley Creek campground. Shuttle drivers were to be provided housing at the residential area near park headquarters. Other campground changes were also proposed but not adopted. Provisions of the general management plan instituted through this process included removing private vehicle access to Sanctuary campground and removing private vehicles from Teklanika River Campground, except for those who stay a minimum of three nights. The Savage River Check Station was to move from the Savage campground to the Savage River. The newsletter process also originated the idea of a lottery to select the private vehicles allowed past Savage River during the September opening of the Park Road. The concessioner was authorized to begin a new tour, the Denali Natural History Tour, to mile 17.5 on the Park Road. **Affected Resources:** visitor use and experience, transportation system and traffic, socioeconomics	Past/Ongoing
	Contract Amendment #3 to Aramark Concession Contract (charging to ride transit)	**Affected Resources:** visitor use and experience, transportation system and traffic, socioeconomics	Past/Ongoing
	Vehicle Use on the Park Road Regulations (2000)	CFR includes a special section for national parks in Alaska (36 CFR 13(C)). 36 CFR 13 provides details for regulation of vehicle traffic on the Park Road. The purpose of the Vehicle Use on the Park Road Regulations is to provide further delineation of management of vehicle use and transportation on the Park Road. **Affected Resources:** visitor use and experience, transportation system and traffic	Past/Ongoing
	Road Design Standards (2007)	The purpose of the Road Design Standards is to quantify the definition of "road character" for the Denali Park Road and bring together in one document the crucial factors that affect the Park Road. The overall management goal is to preserve the unique character of the Park Road and the visitor experience it provides. Effectively, the standards guide repair of the Park Road to work toward achieving the desired service condition for the number and size of design vehicles it is presently required to carry. The standards also provide quantitative guidance to the Federal Highway Administration in designing and engineering repair projects for the Park Road that do not change its unique character. This document identifies which maintenance and repair activities need subsequent management approval and additional NEPA compliance. **Affected Resources:** visitor use and experience, transportation system and traffic, park management and operations	Past/Ongoing

Type of Action	Project	Description of Action	Status
Road Rehabilitation	Road Rehabilitation in Igloo Canyon (2006 EA)	**Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past
	Rehabilitation Between Miles 4 and 4.5 (2007 EA)	This plan guided necessary road rehabilitation work that would provide safe public travelways that can be maintained safely, efficiently, and in a cost-effective manner. The road rehabilitation was needed because of deteriorating road conditions between miles 4 and 4.5, which posed a safety hazard to park staff and visitors (due to substantial aufeis[1] buildup along the road during severe winters). **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past/Ongoing
	Intervisible Pullouts and Other Improvements Between Miles 73 and 86 (2009 EA)	This project addressed unsafe road conditions along a stretch of the Denali Park Road that had a disproportionately low amount of past safety improvements and a disproportionately high percentage of vehicle accidents (relative to other Park Road stretches). **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing
	Regular Park Road Maintenance	Routine maintenance includes replenishment of road surfacing materials, brush cutting and shoulder maintenance, rockfall and mudslide removal, culvert clearing and replacement, trash pickup, fuel delivery, and restroom maintenance. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing
Facilities/ Construction/ Maintenance	Proposed Construction of Visitor Transportation System Facilities (1994 EA)	A decision was made to contract the operation of the shuttle bus system to the concessioner and allow them to set a fee schedule so the system would pay for itself. Pursuant to a June 1994 amendment to the 1981 concession contract, an environmental assessment was prepared to evaluate the placement of facilities needed to house the shuttle maintenance and operations in the park. The proposal included a 4-acre parking lot, doubling the size of the bus maintenance facility, a 24-room employee dormitory, a new employee dining facility, a new leach field for shoulder season operations, moving the recreation courts, and expanding the road network. By terms of the contract amendment, this work was completed by September 1996. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, park management and operations, socioeconomics	Past

[1] Aufeis is layered sheets of ice that build up from successive flows of ground water during freezing temperatures.

Type of Action	Project	Description of Action	Status
Facilities/ Construction/ Maintenance (continued)	Construction of New Visitor Facilities in the Entrance Area of Denali National Park (2001 EA)	This environmental assessment implemented portions of the 1997 *Entrance Area and Road Corridor Development Concept Plan*. Most significantly, it called for placing the major new visitor facilities (including the Denali Visitor Center, Murie Science and Learning Center, food service area, and bookstore/gift shop) at the location of the park hotel rather than at the visitor access center. It also provided for rerouting the Park Road, trail upgrades and reroutes, and the closure of Morino campground. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, park management and operations, socioeconomics	Past (except Murie Science and Learning Center housing, which has not been completed)
	New Depot and Expanded Parking (1999 EA)	**Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, park management and operations, socioeconomics	Past
	Mountain Vista Rest Stop	This project involved the construction of a rest stop near the Savage campground to provide for increased visitor use, experience, and facility needs in the park's entrance area along the road corridor (frontcountry). The project was identified and approved in the park's 1997 *Entrance Area and Road Corridor Development Concept Plan / Environmental Impact Statement*. This frontcountry rest stop includes auto, RV, and bus parking; a bus stop; interpretive exhibits; a covered deck; and vault toilets. The rest stop offers possible future trailheads for the Savage Alpine trail and a short interpretive loop trail. The facilities at the new rest stop enhance the visitor experiences in the park by providing opportunities to experience nature and gain a greater understanding of the park's values. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past
	Construction of Eielson Visitor Center and Permanent Toklat Rest Stop (2004 EA)	This project involved the replacement of the Eielson Visitor Center at mile 65 of the Park Road, as authorized by the 1997 *Entrance Area and Road Corridor Development Concept Plan*. The new visitor center was constructed on the same site as the previous visitor center and was sized to appropriately serve the functions necessary at the site while also blending in with the surrounding landscape as much as possible. The new Eielson Visitor Center enhances the use of the Eielson site for on-site park resource interpretation and as a base for off-site interpretation, as a bus passenger rest stop, and as a bus turnaround and transfer station. The project plans also included construction of improved facilities near the Toklat Rest Stop at mile 54 to accommodate visitor use during the construction of the new Eielson Visitor Center. According to the plan, the Toklat Rest Stop would be made a permanent facility when additional funding becomes available. Bank stabilization work along the Toklat River was also included to protect the visitor and administrative facilities downstream of the west Toklat River Bridge.	Past (Eielson Visitor Center) and Future (Toklat)

Type of Action	Project	Description of Action	Status
Facilities/ Construction/ Maintenance (continued)		**Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	
	Replacement of Chemical Toilets (2009 EA)	This project involved the removal of restroom facilities at Polychrome Overlook, as well as the replacement and/or expansion of restroom facilities at Teklanika Rest Stop, Teklanika River Campground, and Toklat Rest Stop. The project includes the removal of existing chemical toilets and replacing them with nonchemical toilet facilities. These facility improvements are needed to reduce the severe shock loading the chemical-laden wastewater puts on the Riley Creek wastewater treatment facility, to reduce the wastewater pumping and hauling requirements, and to improve the operational efficiency of park management. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Past
	New Trails in Savage Area (2009 EA)	This project involved the construction of the Savage Alpine trail, the Savage Camp interpretive trail, and other short trails that improve the connections between the Savage River, Savage campground, Savage Cabin, and the Mountain Vista Rest Stop along the section of the Denali Park Road from mile 12 to mile 15. The Savage Alpine trail was identified in the 1997 *Entrance Area and Road Corridor Development Concept Plan / Environmental Impact Statement* as a new trail to provide increased recreational opportunities. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing
	Road Rehab in Porcupine Forest Section of Road (2010 EA)	This proposed road rehabilitation project in the Porcupine Forest section of the Denali Park Road (miles 50.8 to 52.4) would improve and add intervisible pullouts, add a gravel surface wear layer, replace culverts, and address drainage and subgrade issues. The project is necessary because this section of road does not meet park standards for intervisible pullouts and has long been identified as having drainage problems and poor subgrade. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Future
	Hotel Construction in Nenana Canyon	**Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, park management and operations, socioeconomics	Ongoing

Type of Action	Project	Description of Action	Status
Other	Purchase of Mining Inholdings in Kantishna (1990 EIS)	The Record of Decision for this plan and environmental impact statement sought to purchase existing mining claims in Kantishna. Since 1990, more than 90% of the patented mining claims have been acquired and more than 98% of the unpatented mining claim acreage has been acquired or has been abandoned. There is one block of unpatented mining claims (Liberty claims on Eldorado Creek) where mining could still occur. **Affected Resources:** visitor use and experience, wildlife and wildlife habitat, park management and operations	Ongoing
	Gravel Acquisition Plan	This plan provided for five gravel extraction sites at Teklanika Pit, East Fork, Toklat River, mile 70 Beaver Ponds, and downtown Kantishna to serve needs for the next 10 years. Additional sites were identified to be evaluated for future use, including Old Teklanika Pit, Forest View, Boundary, Kantishna Airstrip, Friday Creek, Moose Creek Terrace, North Face Corner, and Camp Ridge. **Affected Resources:** visitor use and experience, transportation system and traffic, wildlife and wildlife habitat, wilderness, park management and operations, socioeconomics	Ongoing
	Section 351 of Consolidated Natural Resources Act of 2008	This federal legislation allows for a commercial authorization to a historical operator in Kantishna to offer daily guided hiking west of Toklat. **Affected Resources:** visitor use and experience, transportation system and traffic, park management and operations	Ongoing

VISITOR ACCESS, USE, AND EXPERIENCE

METHODOLOGY AND ASSUMPTIONS

This impact analysis is intended to illuminate the effects of the alternatives on visitor access, use, and experience. Characteristics of visitor access, use, and experience, such as access to wilderness and other park resources, visitors' experience with transportation options, and interpretation provided, as well as the cost of access and visitor safety, may be impacted by the alternatives' actions. The actions that may impact a visitor experience include variations in the types of tours and transit services offered, the extent of prebooking seats planned, and variations in management zoning.

Impacts on visitor access, use, and experience were determined considering the best available information, including visitor surveys, the park's annual reporting data, input gathered from the public during the planning process, and information from park staff.

Measure

The analysis is primarily qualitative rather than quantitative due to the broad level of planning involved, as well as the conceptual nature of the impact topic. Visitor experiences are multidimensional and involve a variety of characteristics or components. This impact analysis considers various qualitative characteristics of visitor use and experience in Denali, including ability of visitors to access wilderness recreational opportunities and other park features via the Park Road, diversity of visitor opportunities, visitors' interpretive experience, visitor safety and comfort, and visitors' opportunity for an affordable park experience.

Intensity Definitions

The following definitions of impact intensity were used for the visitor use and experience analysis.

Minor. Impacts on visitor access, use, and experience would be slight but detectable, and would not appreciably diminish or enhance the characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate. Impacts on visitor access, use, and experience would change the characteristics and/or the number of visitors engaging in an activity would be altered. Visitors would be aware of the effects associated with implementation of the alternative and would likely be able to express an opinion about the changes. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.

Major. Impacts on visitor access, use, and experience would noticeably change the characteristics and/or the number of visitors engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Alternative A assumes that current conditions, including management strategies and visitor services, would continue. Although management adjustments to the transit system are continual and ongoing, those changes are assumed to be fairly minor in scope. Representing the existing conditions, alternative A would continue to manage

vehicle use on the restricted section of the Park Road to maintain the 10,512-vehicle seasonal limit, as well as the various daily limits that were set by the 1986 general management plan and formalized in regulations in 2000. While resource monitoring and visitor survey work would continue to be conducted to address areas of concern, a formal adaptive management approach using indicators and standards would not be adopted.

Visitor Access

Accessing Wilderness. Currently, visitors use the transit system on the Park Road to access park wilderness areas. Under alternative A, the Visitor Transit System (transit) would not change; overnight visitors, including those with backcountry camping permits, as well as those staying in a campground[1], would continue to use the camper shuttle part of the transit service to travel to and from the wilderness areas. Visitors getting into the wilderness by the Park Road would still be limited to shuttle buses for their transportation, as tour buses do not pick up eastbound hikers, and overnight visitors may have too much gear to be able to ride a crowded regular eastbound transit bus.

Overnight visitors must reserve their space on a camper bus in advance when they obtain their backcountry permit. Typically five camper buses circulate per day; Joint Venture has six vehicles converted for use as camper buses. Camper buses fall under the transit allocation, which is limited to 36 per day.

Under alternative A, transit buses are a day hiker's only option for returning from a hike in the wilderness, as tour buses do not pick up eastbound hikers. Eastbound seats on transit buses are currently a limited commodity because many transit riders do not leave their seat on a transit bus, either because they do not know they can get off and catch another bus, or because they are worried about catching the next bus.[2] Scoping comments indicate that shuttle bus riders would like more assurance of being able to get back on a bus if they choose to get off (NPS 2008). Day hikers are told to expect to encounter wait times of up to an hour to return from backcountry areas.

Therefore, alternative A would offer day hikers and campers limited return transportation options.

Accessing Park Features. The Park Road serves as a way for visitors to access various park features, such as visitor centers, rest areas, day use areas, and frontcountry trails. The road also facilitates access to the park's natural and cultural resources. Alternative A would continue to provide access to these park features, such as the Eielson Visitor Center, the Teklanika and Toklat rest areas, six different campgrounds, and various trails, primarily concentrated around the park entrance. The Eielson Visitor Center is currently accessed by the majority of transit riders, by Kantishna Experience visitors, and by inholder lodge bus riders.

All of the concessioner buses except the Tundra Wilderness Tour either start at or make a stop at the Wilderness Access Center. Therefore, visitors often mistake this facility for the Denali Visitor Center even though there is no NPS presence (the facility is run by the concessioner). Some visitors do not realize the Denali Visitor Center exists in the frontcountry, and this facility is underused. According to park staff, approximately 50% of visitors enter the Denali Visitor Center, compared to the park goal of 90% of visitors visiting the center (NPS 2009b).

[1] Except for those Teklanika River campers who go in by private vehicle.

[2] A 2010 visitor use survey asked visitors why they did not get off the bus today to hike; 23% answered inclement weather, 21% said other members of their party weren't interested, and 16% said they were worried about catching another bus.

Rest areas accessed from the Park Road have a high degree of visitor satisfaction, including the condition of the facilities themselves, as well as the level of crowding at those facilities. Visitors have also indicated that the level of crowding at rest stops is a factor in their level of satisfaction.

Of the six campgrounds along the Park Road, only one on the restricted portion of the road west of the Savage River Check Station, Teklanika River, can currently be accessed by private vehicle. If visitors wish to RV camp at Teklanika River Campground, they can drive in, but must reserve a minimum three-night stay; this is to minimize road traffic. Trails along the Park Road are concentrated around the park entrance and do not require the transportation system for access. Of those trails farther out along the road, some are located at Eielson and one is at Wonder Lake.

No change would be made to park feature access in alternative A; this would mean little opportunity to improve access to Denali's visitor centers or minimize crowding at wildlife stops. Alternative A would continue the current practice of monitoring the level of rest area crowding, which is done with visitor surveys, but is not a part of any formal adaptive management approach. Vehicle traffic would continue to be permitted to Teklanika River Campground and would continue to be limited by the three-night minimum reservation requirement.

Cost of Access. Several components are currently involved in the cost of Denali Park Road access. Entrance fees, costs of tour or transit tickets, and other costs such as food and beverages impact the affordability of the visitor's park experience. Ticket prices during 2010, for example, range from $24 for an individual adult transit ticket to $155 for an individual adult Kantishna Experience ticket, which includes lunch, snack, beverages, and hotel pickup. This current ticket structure therefore provides a broad range of cost options for the Denali Park Road visitor. What the current situation does not provide, however, is a low-cost tour option. The lowest priced tour ticket for 2010 was the Denali Natural History Tour, at $60.75 for an adult ticket. The Denali Natural History Tour takes the visitor as far as Primrose Ridge, which is not far past the Savage River Check Station. In contrast, a visitor could have paid $46 in 2010 and been able to travel out the length of the Park Road on a transit bus, albeit without the assistance of interpretive services. The visitor looking for an affordable tour opportunity that takes them farther out on the road than they could reach on their own by car does not have many opportunities to do so under the current situation. For that reason, visitors often use transit buses as a substitute for a low-cost tour.

Because of limited hiker and camper return transportation options, the lack of an economy tour offering, and the limited opportunity to improve access to Denali's visitor centers, Alternative A would have a minor adverse impact on visitor access.

Visitor Use and Experience

Transportation Use and Experiences. Under alternative A, visitors can choose between exploring the park via the transit system or by one of three different premium tours. This alternative would continue to offer a transit system where visitors are free to get off and reboard at any point, which is designed to accommodate independent travelers. Many riders on this current system, however, use the transit buses as a low-cost tour, where they retain their seat for the duration of the trip. The current condition does not offer a self-guided economy tour. Other opportunities for visitors to explore the park are provided by the concessioner-run premium tours. Under alternative A, visitors would be able to choose between the Denali Natural History Tour; the Tundra Wilderness Tour, which goes to mile 62 on the road; or the Kantishna Experience, which is currently offered by one bus per day. Most visitors interested in a tour could be accommodated,

but there are days and times when the demand for tours has exceed the supply available.

Under the no-action alternative, visitors would continue to have limited choices for experiencing the park for a low cost. Without a separate economy tour offering, visitors looking for a tour experience at a lower cost would continue to take the transit buses, but may not get on and off the bus. This would interfere with other visitors' ability to leave the transit bus and explore off-bus opportunities, as they may be concerned about finding a seat when they want to reboard.

Alternative A may not fully meet the plan's objective of providing freedom of movement for recreational access to park resources.

Park Interpretive Experiences. Under alternative A, visitors have both on-bus and off-bus interpretive experiences while traveling on the Park Road. The overall interpretive experience, however, is significantly dominated by on-bus interpretation, as the majority of the visitor's experience in the park is on a vehicle. On-bus interpretation is provided by the current Denali concessioner, Joint Venture. Joint Venture has held the concession contract for transportation services at Denali since 2003, and some Joint Venture drivers have more than 20 years of experience as drivers and guides in the park. Visitors on tour buses receive a full interpretive experience, conducted by certified driver-naturalists. The interpretation on the premium tour buses currently varies somewhat by tour—the Denali Natural History Tour is focused on Denali's natural and cultural history, the Tundra Wilderness Tour provides an in-depth history of the park while pointing out wildlife facts, and the Kantishna Experience provides park history as well as an in-depth look into Kantishna mining history. On the transit shuttles, on-bus interpretation is intentionally limited in nature. While drivers of transit shuttles wear headsets, they do not provide full narration, but will answer visitors' questions.

Off-bus interpretation in the no-action alternative would continue to focus on tour-related experiences, such as the living history interpretive programming at Savage Cabin and Alaska Native cultural interpretation at the Primrose Overlook that are a part of the Denali Natural History Tour. Other off-bus interpretive experiences under alternative A would include programming conducted by NPS staff. This would include interaction with rangers at visitor center facilities; visitors have opportunities to interact with NPS rangers at both the Denali Visitor Center and the Eielson Visitor Center.

As on-bus interpretation is provided by a commercial operator rather than NPS staff, ensuring the delivery of desired park messages can be challenging. One of the objectives of this plan is to ensure the transportation system provides the means for visitors to spend time at a visitor center. The Denali Visitor Center would likely continue to receive 50% of all park visitors under current conditions (Denali Education Plan 2009). Although this facility is intended to be the primary provider of visitor information services in the entrance area, visitors confuse its role with that of the Wilderness Access Center. The Wilderness Access Center provides limited interpretive services. With no changes being made to the system to clarify the roles of these two frontcountry visitor interpretive buildings, this interpretation challenge would continue.

Alternative A provides access to off-bus, ranger-provided interpretive opportunities and opportunities for NPS ranger interaction on buses.

Visitor Safety and Comfort. Visitor safety and comfort on the Park Road are largely influenced by the safety of road travel as well as the comfort of the buses themselves. The safety of the visitor while traveling the road is currently ensured by implementation of the

park's "Rules of the Road" safety procedures, which cover issues such as rights-of-way and vehicle yielding procedures. These policies currently provide for the safe meeting and passing of vehicles on the Park Road, which is a safety priority, given the winding, narrow nature of much of this historic road. Addressing visitor safety issues (such as improving site distance, providing for adequate passing width, and improving surface road friction) was a top priority of the general management plan (NPS 2009b).

Components of visitor comfort in the current condition include elements such as dust generation, improperly functioning windows, and uncomfortable seating. These issues have been mentioned by visitors in surveys (Manning and Hallo 2009). Although a majority of visitors have reported that they are satisfied with their "overall experience on the Denali Park Road,"[1] when asked what things they enjoyed the least, "uncomfortable seats on the bus" was the second most common reason for their dissatisfaction.[2]

Alternative A would continue to provide for the safety of visitors on buses by continuing the "Rules of the Road" system of vehicle safety procedures. This alternative would also continue to use the current buses, which most visitors find to be acceptable. Alternative A would continue the current dust control system, which largely satisfies most visitors' concerns about dusty bus rides.

Even though alternative A may not fully meet the plan's objective of providing freedom of movement for recreational access to park resources, it does provide a safe and comfortable Park Road experience and provides access to quality interpretive experiences from certified drivers and rangers. For these reasons, alternative A would have a minor beneficial impact on visitor use and experience.

Cumulative Effects

Several past, present, and reasonably foreseeable actions may affect visitor use and experience within the project area. Past actions such as construction of the Eielson Visitor Center had a beneficial impact on visitor access to park features. Construction of permanent rest area facilities at Toklat could have a beneficial impact on access to park features for visitors that go out to Toklat. Implementation of the proposed (2009) new trail construction at Savage would beneficially impact visitors' experience on the Park Road by providing more places for visitors taking the transit system to get off the bus and explore the park. As a result of these actions, there have been long-term, moderate, beneficial impacts on visitor use and experience. In addition to these long-term benefits, the ongoing implementation of the gravel acquisition plan and other related road repair projects may have a long-term, minor, adverse impact on visitor experience if the associated construction traffic occurs during peak hours.

When combined with the impacts of alternative A, the cumulative impacts on visitor access, use, and experience would be long-term, moderate, and beneficial. The impacts of alternative A would result in a substantial contribution to cumulative effects realized by the past, present, and reasonably foreseeable future actions.

Conclusion

Under alternative A, no changes would be made to the park's transportation system. Continued implementation of this system would affect the various components of the visitor experience differently. Alternative A would have a long-term, minor, beneficial impact on visitors' interpretive experience

[1] Mean satisfaction rating 1.4 on a scale of 2 = very satisfied, 1 = satisfied (Manning and Hallo 2009; Table 4-33).

[2] Manning and Hallo 2009, Table 3-5. Codes assigned for responses to question, "What are the three things you enjoyed least about your time on the Denali Park Road today?"

and safety, as the current system provides access to interpretive services, and provides a safe bus experience governed by strict adherence to road rules. Alternative A would have long-term, minor, adverse impacts on visitor access, including cost of access, access to wilderness and other park features due to the perception that there may not be enough eastbound seats, and the demand for tours has exceeded capacity in some cases. The overall impact on visitor access, use, and experience would be local and regionwide, long-term, minor, and beneficial.

IMPACT MANAGEMENT COMMON TO ALL ACTION ALTERNATIVES

All action alternatives (B, C, and D) in this analysis use an adaptive management system of indicators and standards to manage visitor capacity. Alternative D uses adaptive management in conjunction with a numerically based maximum, while alternatives B and C replace the current numerically based system of capacity management with an adaptive management system. The system proposed by the action alternatives uses a variety of natural resources as well as social condition indicators to track changes that may result from human actions. Standards that indicate the minimum acceptable condition for each indicator would be monitored to determine whether the park's desired conditions are being met. The assigned standard for each of these indicators would be monitored through various methods, and a range of management actions are identified that would be implemented in the event of standard violation.

Establishing a set of strategies to implement in the event of a standard violation would create a nuanced and proactive management structure that could adeptly respond to individual components of the visitor's experience when those components are not reaching desired conditions. For example, by using as an indicator the number of vehicles at wildlife stops, specific attention would be focused on an important component of visitor satisfaction.

In the case of the wildlife stop indicator, the strategy or tools include addressing nonsystem use, making changes to the bus schedule, removing buses from the schedule, or revising the transportation system back to a level preceding the standard violation. This would make the action alternatives responsive to the diversity of components that comprise the visitor experience.

ALTERNATIVE B

Visitor Access

Accessing Wilderness. In this alternative, the transit system would be combined with an economy tour, and these buses would provide seats both for visitors who purchased transit tickets as well as for those who purchased economy tour tickets. All passengers on this combined system could get off and reboard the bus at any point, although economy tour visitors could retain their seat for the entire trip. Furthermore, to fully optimize the capacity of the transportation system, a majority of seats on the transit/economy tour buses would be prebooked. In addition, there would no longer be a camper bus offered under this alternative; strategies would be explored for carrying recreation equipment such as camping gear on the exterior of transit buses.

Under alternative B, campers and day hikers may have difficulty accessing park wilderness areas. With transit and economy tour service combined, certain designated transit buses would be filled to capacity with economy tour passengers. Other transit buses would be scheduled for similar departure times, designed to accommodate transit passengers such as day hikers and campers. This system should avoid undue seat competition; however, without dedicated camper buses with seats removed, the average wilderness visitor who requires more space may find it

challenging to find a transit seat with enough space. This may make it difficult for a hiker carrying gear to comfortably ride a transit bus.

Hiker wait time would be an indicator under this alternative. Most visitors (at least 75% would wait 30 minutes or less and almost all visitors (at least 95%) would wait 60 minutes or less; adaptive management strategies would be employed in following years if wait times were found to exceed the standards. These strategies could include leaving more empty seats on buses, adding more buses, adjusting nonsystem uses, circulating empty "deadhead" buses, or moving allocation from the tour system to the transit buses. For more information on the hiker wait time indicator and standard and adaptive management in general, see chapter 2.

When compared to the no-action alternative, this alternative would benefit visitors' access to wilderness due to the codification of hiker wait times and because wait times would be monitored and managed through adaptive management.

Accessing Park Features. The transit and tour options in alternative B would continue to provide access to park features such as the Denali Visitor Center, the Eielson Visitor Center, the Teklanika and Toklat rest areas, six different campgrounds, and various trails. This alternative does not propose any changes to these features themselves, but rather proposes changes in the way those features would be accessed. Some of these features are currently underused, while other features are at risk of overcrowding. For example, according to park staff, approximately 50% of visitors to Denali currently enter the Denali Visitor Center, compared to a park goal of 90% of park visitors visiting that center (Denali Education Plan 2009). Additionally, while rest areas are consistently held in high regard by visitors, the number of vehicles at rest stops has been identified as an important factor in visitor satisfaction.

Maximizing seating on all transit and tour vehicles would thereby offer the largest number of visitors an opportunity to access park features. Also, to fully optimize the transportation system, in keeping with the general concept of alternative B, the Park Service may study the possible effects of using larger buses on a section of the Park Road. Larger buses would potentially be used only in Wildlife Viewing Subzone 1, from Savage River to Teklanika, as this road segment would not require structural upgrades to the road to accommodate larger buses. If such studies resulted in no adverse effects and standards could be maintained, larger buses could be considered up to Teklanika, leading to increased opportunities for visitors to access park features. In addition, visitors who book a self-guided economy tour would begin their tour at the Denali Visitor Center with a park orientation (transit services would start at the Wilderness Access Center), increasing access to this park feature.

Furthermore, under alternative B, use of an adaptive management strategy would minimize impacts on features that could be potentially overused, such as rest stops and wildlife stops. The number of vehicles at rest stops and wildlife stops would be an indicator, and compliance with the standards (see chapter 2 for standards) would be monitored multiple times per season, both remotely and directly. This would help ensure continued quality of access to Park Road rest areas and wildlife stops.

Alternative B also proposes a potential change to one of the park's campgrounds, Teklanika River Campground. Over a 10-year period, this campground could become a tents-only campground, where visitors would access the campground using the park transportation system rather than their private vehicles. The intent of this change would be to optimize visitor access to the park by reducing the system inefficiency of private vehicle access. This change would open more space in the system for buses or other vehicles that can carry more people.

Although elimination of RV camping at Teklanika River Campground would have a negative effect on the RV camping visitor by reducing opportunities to camp with an RV in Denali, alternative B would have an overall focus on optimizing access to the park as well as adding more stops at visitor centers. When compared to the no-action alternative, this would be an improvement in access to park features due to the transportation system's focus on getting more people to the Park Road and those features. The overall supply (the number of seats available) provided by the transportation system in alternative B is expected to be greater than that of alternative A.

Cost of Access. Under alternative B, components involved in the cost of Denali Park Road access would include entrance fees, costs of tour or transit tickets, and other costs such as food and beverages. Ticket prices would span a range of cost options, from short transit trips through the longest premium tour trips. Although a dedicated low-cost tour option would not be available in alternative B, an economy tour would be available on the combined transit system / economy tour buses. This would help address the current gap in the cost spectrum. Furthermore, the major purpose in combining transit with an economy tour is to provide the greatest number of visitors an affordable option for accessing the park. Combining these two services could result in buses operating at or near capacity, which would provide maximum efficiency to the system, thereby potentially lowering ticket prices. When compared to the no-action alternative, this action would benefit visitors due to the addition of more price points along the ticket cost spectrum.

Alternative B would have a minor, beneficial impact on visitor access, as the adverse effects on access to wilderness would negate some of the benefits relating to access to park features and cost improvements.

Visitor Use and Experience

Transportation Use and Experiences. Under alternative B, visitors could choose to explore the Park Road either on a combined transit system / economy tour bus or on one of two premium tours offered. The combined economy tour / transit bus is briefly described above and in more detail in chapter 2. Alternative B also would offer guided premium tours. The guided premium tours in alternative B would be differentiated primarily by length—a short tour and a long tour. The premium short tour would be up to a half-day long, would be offered to various designated locations to Teklanika, and would stop at the Denali Visitor Center. The premium long tour in alternative B would be a full-day experience traveling anywhere in the park up to Kantishna, but with most tours not going farther than the Eielson Visitor Center. These tours would cover a variety of tour topics and destinations along the way. Premium long tour topics and destinations would be driven by visitor demand under this alternative.

Alternative B would provide a variety of opportunities for the Denali Park Road visitor. Alternative B provides visitors the opportunity for an economy tour experience as well as various types of premium tours. Under alternative B, premium tours are differentiated primarily by their length rather than by their topics, and as such may not offer the visitor the maximum topical diversity of Park Road experiences. The configuration of the economy/transit option in alternative B also limits the diversity of visitor opportunities on the Park Road. By combining the transit bus with an economy tour option where the passenger may not get off the bus, alternative B may not facilitate opportunities for the visitor to participate in diverse off-bus experiences such as scheduled Discovery Hikes, walks on self-guided trails, or time spent at visitor centers or picnic areas.

When compared to the no-action alternative, alternative B would benefit visitors due to the

addition of a new bus experience—the economy tour.

Park Interpretive Experiences. Alternative B makes some changes to the visitor's interpretive experience along the Park Road. This alternative's economy tour offering would provide interpretive materials to visitors who are looking for a more affordable option in a tour setting. In addition, premium tours would offer on- and off-bus interpretive experiences. These may include video camera and screen systems on the buses for better close-up wildlife viewing as well as off-bus interpretive experiences, such as professional interpretive programs at destinations or guided talks at certain locations.

The economy tour would create an opportunity for visitors who would like the guidance of a tour without the higher price of a premium tour. Materials included with the economy tour ticket could include guidebooks, lists of options for off-bus activities, and activity packs for young visitors. Self-guided economy tour materials could also use technology and include items such as podcasts or other audio items. These educational items for visitors are not currently included with any ticket under a premium tour ticket, and many, such as road guide podcasts, are not currently available.

When compared to the no-action alternative, this action would benefit visitors due to the increased availability of interpretive materials for economy tour passengers.

Visitor Safety and Comfort. This alternative includes the opportunity for economy tour passengers to select and save more desirable seats for the length of their tour, which may add to their comfort.

When compared to the no-action alternative, alternative B would benefit visitors due to the possibility for economy tour passengers to select and save more desirable seats for the length of their tour, which may add to their comfort. There would be no change to visitor safety in this alternative.

Alternative B would have a minor, beneficial impact on visitor use and experience by providing a new economy tour, new interpretive materials, and potentially providing more comfort for economy tour passengers.

Cumulative Effects

The past, present, and reasonably foreseeable future actions described for alternative A would contribute to the cumulative effects of alternative B. The cumulative impacts of alternative B on visitor access, use, and experience would be long-term, moderate, and beneficial. The impacts of alternative B would result in a substantial contribution to the cumulative effects realized by the past, present, and reasonably foreseeable future actions.

Conclusion

Under alternative B, changes to the park's transportation system would focus on optimizing the number of visitors who can access the park. Implementation of this system would affect most components of the visitor experience positively. Alternative B could have a negative impact on access to wilderness due to transportation changes such as combining the transit system with an economy tour and not having configured camper buses. Alternative B would have long-term, minor, beneficial impacts on all other elements, including the cost of access, access to park features, visitors' transportation and interpretive experience, and visitor comfort. Alternative B would result in a long-term, local and regionwide, minor, beneficial impact on visitor access, use, and experience.

ALTERNATIVE C

Visitor Access

Alternative C emphasizes providing the visitor with a wide range of visitor opportunities, which would generally benefit the type and quality of access to park resources, such as wilderness, and developed features, such as rest areas and visitor centers. The quantity of visitors accessing the park is not the primary focus of the alternative. Thus, while an individual visitor's access to park elements may improve under this alternative, the number of visitors accessing the Park Road is not optimized.

Accessing Wilderness. Under alternative C, transit buses would be separate from economy tour buses, a system designed to facilitate spontaneity, freedom, and access to a range of off-bus experiences for the independent traveler. Additionally under this system, some seats would be reserved from prebooking in order to enable spontaneous trip planning for walk-in visitors and to pick up eastbound hikers. Economy tour buses would not retain open seats, but if open seats were available on eastbound buses, those buses would be permitted to pick up hikers. With a separate economy tour available, it is expected that visitors who are now using the transit system as a form of economy tour would switch to the economy tour bus, thereby freeing transit seats for wilderness visitors and their equipment. This alternative also provides a dedicated, 28-seat camper bus for backcountry visitors, with space in the back of the bus to stow gear.

Similar to alternative B, hiker wait time would be an indicator under this alternative. Most visitors (at least 75% would wait 30 minutes or less and almost all visitors (at least 95%) would wait 60 minutes or less; adaptive management strategies would be employed in following years if wait times were found to exceed the standards. These strategies could include leaving more empty seats on buses, adding more buses, adjusting nonsystem uses, circulating empty "deadhead" buses, or moving allocation from the tour system to the transit buses. For more information on the hiker wait time indicator and standard and adaptive management in general, see chapter 2.

Accessing Park Features. Alternative C promotes a diversity of visitor opportunities and would include some alterations to the method of accessing various park features, such as visitor centers, rest areas, campgrounds, day use areas, and frontcountry trails. The transit and tour options in alternative C would continue to provide access to park features such as the Denali Visitor Center, the Eielson Visitor Center, the Teklanika and Toklat rest areas, six different campgrounds, and various trails. For the most part, this alternative focuses on the access to those features and does not propose any changes to these features themselves.

Some of these features are currently underused, while other features are at risk of overcrowding. For example, according to park staff, approximately 50% of visitors to Denali National Park currently enter the Denali Visitor Center, compared to a park goal of 90% of park visitors visiting that center (NPS 2009b). Additionally, while rest areas are consistently held in high regard by visitors, the number of vehicles at rest stops has been identified as an important factor in visitor satisfaction, as well as the number of vehicles at wildlife stops.

The provision of a dedicated economy tour under alternative C would offer a potentially large number of visitors the opportunity to access the Denali Visitor Center. All economy tours would originate at either the Wilderness Access Center or the Denali Visitor Center. In addition, the alternative's use of an adaptive management strategy could benefit potentially overused park features such as rest stops and wildlife stops. The number of vehicles at rest stops and wildlife stops would be indicators, and compliance with the standards for those indicators would be monitored multiple times

per season, both remotely and directly. For example, in Wildlife Viewing Subzone 1, the standard is "No more than 12 buses at one time with a total of no more than 16 vehicles" at the Teklanika Rest Stop. This would help ensure continued quality of access to Park Road rest areas.

Alternative C also proposes minor changes that would impact access to one of the park's campgrounds, Teklanika River Campground. Private vehicles going into the Teklanika River Campground for their three-day minimum stay would only be able to travel westbound on the Park Road during designated periods of low traffic volume. This could create inconvenience in campers' travel planning.

When compared to the no-action alternative, this alternative would benefit visitors due to the increased potential for access to visitor centers. In addition, the transportation system's overall supply (total number of seats available) provided in alternative C is expected to be slightly greater than that provided in alternative A.

Cost of Access. The components of the cost of Denali Park Road access would include entrance fees, costs of tour or transit tickets, and other costs such as food and beverages. Ticket prices would span a range of options, from short transit trips through the longest premium tour trips. In alternative C, a dedicated low-cost tour option would be available. This additional offering would help fill a gap in the cost spectrum. This spectrum would include both lower- and higher-cost transportation options for visitors. When compared to the no-action alternative, this action would benefit visitors due to the addition of more price points along the ticket cost spectrum.

Alternative C would have a minor beneficial impact on visitor access by providing a low-cost tour, a separate transit system, and more opportunities to access park visitor centers.

Visitor Use and Experience

Transportation Use and Experiences. Under alternative C, visitors could choose to explore the Park Road in one of many ways—on a municipal-style transit bus system designed to facilitate independent exploration, on an economy tour bus with interpretive materials, or on one of several premium tours. The economy tour and transit bus opportunities are briefly described above and in more detail in chapter 2. The guided premium tours available in this alternative would include a variety of options of different lengths and topics designed to meet the needs of a diverse audience, and could include a focus on such topics as birding or wolves. Premium tours in alternative C also would ensure park visitors interact with at least one NPS interpretive facility or staff member during their visit, rather than only with their bus driver. Tours would also include opportunities for off-bus experiences, such as guided walks and demonstrations.

Alternative C would provide a wide range of visitor opportunities, and would give visitors the option of either an economy tour with passive interpretation or a transit bus experience. For the premium tour visitor, alternative C would provide a range of tour topics tailored to various audiences. When compared to the no-action alternative, this alternative would benefit visitors due to the addition of a dedicated economy tour and premium tours that focus on specialty topics visitors might be interested in.

Park Interpretive Experiences. Alternative C proposes several changes to the visitor's interpretive experience along the Park Road. This alternative would offer a separate economy tour that would provide the visitor with an independent, affordable, on-bus park road experience. This experience would be a self-guided tour provided via a dedicated bus system. Interpretive materials provided on this tour could include guidebooks, lists of options for off-bus activities, and activity packs for young visitors. Self-guided economy tour

materials could also use technology and include items such as podcasts or other audio items. The premium tours in alternative C would also offer on- and off-bus interpretive experiences. These may include video camera and screen systems on the buses for better close-up wildlife viewing, as well as off-bus interpretive experiences such as professional interpretive programs at destinations or guided talks at certain locations.

Alternative C may offer the visitor increased interpretive options, primarily due to the addition of a separate economy tour with its own interpretive offerings. This would create a new opportunity for visitors who would like the guidance of a tour without the higher price of a premium tour. These educational items for visitors, although available for separate purchase, are not currently offered with the purchase of any ticket less than a premium tour ticket, and many, such as road guide podcasts, are currently not available at all.

The addition of a new layer of interpretation in alternative C through creation of the dedicated economy tour and addition of themed specialty tours would offer visitors a unique interpretive experience. When compared to the no-action alternative, this action would benefit visitors due to the potential increase in variety of interpretive options.

***V*isitor Safety and Comfort.** Alternative C would provide for the possibility of changing the tour buses used on the Park Road. To maximize a range of visitor opportunities, in keeping with the general concept of alternative C, tour sizes would be tailored to the needs and constraints of that particular tour program. Consequently, the size and accoutrements of those tour buses could change as well, although they would not exceed the current design standards for bus size. In addition, premium tours in this alternative could increase visitor comfort on tour buses by reducing the number of seats on these buses. For these reasons, alternative C would have potential long-term, moderate, beneficial impacts on visitor comfort. There would be no change to visitor safety in this alternative.

Alternative C would have a moderate, beneficial impact on visitor use and experience by providing a separate economy tour, themed specialty tours, and potentially providing more legroom on the premium tours.

Cumulative Effects

The past, present, and reasonably foreseeable future actions described for alternative A would also contribute to the cumulative effects associated with alternative C. When the impacts from alternative C are combined with these other past, present, and reasonably foreseeable future actions, there would be long-term, moderate, beneficial cumulative effects under alternative C, and alternative C would contribute substantially to the cumulative benefits.

Conclusion

Under alternative C, changes to the park's transportation system would focus on maximizing a range of visitor opportunities. Implementation of this system would affect all components of the visitor experience positively. Alternative C would have a long-term, minor, beneficial impact on visitor access and a moderate, beneficial impact on visitor use and experience. Overall, alternative C would have a local and regional, moderate, beneficial impact on visitor access, use, and experience.

ALTERNATIVE D

Visitor Access

Accessing Wilderness. In alternative D, park visitors would access backcountry areas primarily through the transit system. In this alternative, the transit system would remain

largely the same as in alternative A. Access in this alternative would be subject to a maximum daily vehicle limit of 160 vehicles per day. The change from a seasonal vehicle limit to a daily vehicle limit is not expected to affect visitors' access opportunities to wilderness areas because it is anticipated that existing and foreseeable future demand can be accommodated within the maximum daily vehicle limits.

To fully optimize the capacity of the transportation system, a majority of seats on the transit buses would be prebooked under alternative D. However, some open seats would be retained for walk-in visitors. Passengers on transit buses would be able to get off and reboard the bus at any point. To accommodate wilderness visitors' backpacking gear, strategies would be explored for carrying recreation equipment such as camping gear on the exterior of transit buses. A separate camper bus would not be provided in this alternative.

Under alternative D, campers and day hikers might encounter increased challenges in accessing park wilderness areas due to the absence of a camper bus. Transit buses would be designed to accommodate day hikers and campers; the system should provide adequate room on buses and avoid undue seat competition. However, without dedicated camper buses with seats removed, the average wilderness visitor who requires more space might find it challenging to find a transit seat with enough space. This might make it difficult for a hiker carrying gear to comfortably ride a transit bus. Furthermore, wilderness visitors might have concerns about their gear being on the exterior of the bus rather than inside under their control.

As with the other action alternatives, hiker wait time would be an indicator under alternative D. Most visitors (at least 75%) would wait 30 minutes or less and almost all visitors (at least 95%) would wait 60 minutes or less; adaptive management strategies would be employed in following years if wait times were found to exceed the standards. These strategies could include leaving more empty seats on buses, adding more buses, adjusting nonsystem uses, circulating empty "deadhead" buses, or moving allocation from the tour system to the transit buses. For more information on the hiker wait time indicator and standard and adaptive management in general, see chapter 2.

When compared to the no-action alternative, this alternative would benefit visitors' access to wilderness due to the codification of hiker wait times and because wait times would also be monitored and managed through adaptive management. The impact of eliminating camper buses in alternative D, however, might be a negative factor in the wilderness access scenario.

Accessing Park Features. The transit and tour options in alternative D would continue to provide access to park features such as the Denali Visitor Center, the Eielson Visitor Center, the Teklanika and Toklat rest areas, six different campgrounds, and various trails. This alternative does not propose any changes to these features themselves, but rather proposes changes in the way those features would be accessed. In this alternative, access would be subject to a maximum daily vehicle limit of 160 vehicles per day. The change from a seasonal vehicle limit to a daily vehicle limit is not expected to affect visitors' access opportunities to park features because it is anticipated that existing and foreseeable future demand could be accommodated within the maximum daily vehicle limits.

Some park features are currently underused, while other features are at risk of overcrowding. For example, according to park staff, approximately 50% of visitors to Denali currently enter the Denali Visitor Center, compared to a park goal of 90% of park visitors visiting that center (Denali Education Plan 2009). Additionally, while rest areas are consistently held in high regard by visitors, the number of vehicles at rest stops

has been identified as an important factor in visitor satisfaction.

Promoting the optimal use of all transit and tour vehicles would offer the largest number of visitors an opportunity to access park features. Also, to fully optimize the transportation system, the Park Service might study the possible effects of using larger buses on a section of the Park Road. Larger buses would only be considered for use in Wildlife Viewing Subzone 1, from Savage River to Teklanika, as this road segment would not require structural upgrades to the road to accommodate larger buses. If such studies resulted in no adverse effects and standards could be maintained, larger buses could be considered up to Teklanika, leading to increased opportunities for visitors to access park features. In addition, all transit buses under alternative D would stop at the Denali Visitor Center on their eastbound trip, increasing access to this park feature.

Furthermore, the use of an adaptive management strategy in alternative D would minimize impacts on features that could be potentially overused, such as rest stops and wildlife stops. The number of vehicles at rest stops and wildlife stops would be an indicator, and compliance with the standards (see chapter 2 for standards) would be monitored multiple times per season, both remotely and directly. This would help ensure continued quality of access to Park Road rest areas and wildlife stops.

While alternative D would not change the current system of private vehicle access to Teklanika River Campground, it does allow for the future option of limiting private vehicle travel to the campground to low traffic hours. However, these restrictions would only be implemented if they became necessary to meet standards. If this restriction needed to be implemented, it could create an inconvenience for campers' travel planning.

Alternative D would focus on optimizing access to the park as well as adding more stops at visitor centers. When compared to the no-action alternative, this would be a slight improvement in the quantity and quality of access to park features due to the addition of a transit visitor stop at the Denali Visitor Center, as well as implementation of an adaptive management system used in conjunction with numerical vehicle limits. This would help maintain and improve the quality of access to features such as rest stops and wildlife stops.

Cost of Access. Under alternative D, components involved in the cost of Denali Park Road access would include entrance fees, costs of tour or transit tickets, and other costs such as food and beverages. Ticket prices would span a range of cost options, from short transit trips through the longest premium tour trips. Under this alternative, buses would likely continue to operate at or near capacity, which would provide maximum efficiency to the system, and would thereby maintain accessible ticket prices. When compared to the no-action alternative, this alternative would likely have little to no impact on the visitor's cost of access.

Overall, alternative D would have a minor, beneficial impact on visitor access, including access to wilderness, park features, and the cost of access.

Visitor Use and Experience

Transportation Use and Experiences. Under alternative D, visitors could choose to explore the Park Road either on a transit bus or on one of two premium tours offered. The transit option is briefly described above and in more detail in chapter 2. Alternative D would also offer guided premium tours. The guided premium tours in alternative D would be differentiated primarily by length—a short tour and a long tour. The premium short tour would be up to a half-day long, would be offered to various designated locations up to Teklanika, and would stop at the Denali Visitor Center. The premium long tour in

alternative D would be a full-day experience traveling anywhere in the park up to Kantishna, but with most tours not going farther than the Eielson Visitor Center. These tours would cover a variety of tour topics and destinations along the way. Premium long tour topics and destinations would be driven by visitor demand under this alternative.

Alternative D would provide a range of transportation opportunities for the Denali Park Road visitors, similar to that of alternative A. The premium tours of alternative D are differentiated primarily by their length rather than by their topics. While this may not offer the visitor the same topical diversity currently offered by tour choices, it would benefit visitors who want to choose their tour primarily by trip length. Alternative D would also offer visitors the option of going on a premium tour guided by the Murie Science and Learning Center. These educational tours would be offered on a variety of topics. The Murie Science and Learning Center offering would likely fill a topical diversity need for visitors.

When compared to the no-action alternative, alternative D would be beneficial to the visitor's transportation experience.

Park Interpretive Experiences. The interpretive experience provided by alternative D would be largely similar to the existing interpretive experience. Under alternative D, all transportation options would offer self-guided materials to visitors. In addition, the premium tours would offer on- and off-bus interpretive experiences. These may include video camera and screen systems on the buses for better close-up wildlife viewing, as well as off-bus interpretive experiences such as professional interpretive programs at destinations or guided talks at certain locations.

Varying the premium tours in alternative D by length rather than by topic may help ensure a greater degree of consistency in the visitors' interpretive experience. Furthermore, for visitors looking for additional topical interpretation and education, the Murie Science and Learning Center tour offerings would address that need.

Self-guided tour materials that would be available in this alternative could include guidebooks, lists of options for off-bus activities, and activity packs for young visitors. Self-guided tour materials could also use technology and include items such as podcasts or other audio items. These educational items for visitors are not currently included with any ticket under a premium tour ticket, and many, such as road guide podcasts, are currently not available at all.

When compared to the no-action alternative, this alternative would benefit visitors due to the increased availability of interpretive materials for transit passengers and improvements in tour interpretive experiences and offerings.

Visitor Safety and Comfort. When compared to the no-action alternative, alternative D may have a negative impact on the comfort of the transit passenger, due to the elimination of camper buses. With all gear going in or on the outside of regular transit buses, visitors may feel their seat space is compromised. There would be no change to visitor safety in this alternative.

Alternative D would have a minor, beneficial impact on visitor use and experience by providing a range of tours, more interpretive materials, and educational tour offerings from Murie Science and Learning Center. The possible detrimental impact on visitor comfort triggered by the elimination of a dedicated camper bus may slightly offset this beneficial impact.

Cumulative Effects

The past, present, and reasonably foreseeable future actions described for alternative A would contribute to the cumulative effects of

alternative D. The cumulative impacts of alternative D on visitor access, use, and experience would be long-term, moderate, and beneficial. The impacts of alternative D would result in a substantial contribution to the cumulative effects realized by the past, present, and reasonably foreseeable future actions.

Conclusion

Under alternative D, the number of vehicles allowed on the restricted section of the Park Road would not exceed a certain maximum daily level. In addition to this maximum level, indicators and standards would also be used for vehicle management. Overall, alternative D would focus on optimizing the number of visitors who can access the park. Implementation of this system would affect most components of the visitor experience positively. Alternative D could have a small, negative impact on access to wilderness due to the absence of dedicated camper buses, as well as a small, negative impact on visitor comfort for the same reason. The alternative would have long-term, minor, beneficial impacts on all other elements, however, including access to park features and visitors' transportation and interpretive experience. Alternative D would result in a local and regionwide, long-term, minor, beneficial impact on visitor access, use, and experience.

TRANSPORTATION SYSTEM AND TRAFFIC

METHODOLOGY AND ASSUMPTIONS

The quality of the transportation system is primarily dependent on how efficiently and effectively the system transports visitors through the park. Its quality is also defined by how the system provides transportation services while also minimizing system costs, road traffic, or degraded traffic flow on the road network.

Measure

Impacts on the transportation system and traffic were analyzed relative to the transportation system options available to visitors and employees under each alternative. Implementing any of the action alternatives could result in changes in destinations for tour and transit service, changes in use of tour versus transit service, and changes in other vehicle use.

The assumptions used to evaluate transportation system and traffic impacts when the services in the action alternatives (not including alternative A) are fully implemented include the following:

- All vehicles traveling on the restricted section of the Park Road would be required to follow a set pattern for vehicle movement to meet standards for achieving desired conditions.
- When allocating vehicle use within the transportation system, the transit service would have priority.

Intensity Definitions

Minor. Changes to the efficiency and effectiveness of transporting visitors through the park would be slight. However, these changes would not appreciably alter the existing transportation services in the park. Some small increases or decreases in the vehicle or passenger volumes on the Park Road could occur. Changes to transportation system costs and/or road traffic conditions would be minimal.

Moderate. Changes to the efficiency and effectiveness of transporting visitors through the park would occur. Modest increases or decreases in the vehicle volumes or passenger volumes on the Park Road could occur. Changes to transportation system costs and/or road traffic conditions would occur.

Major. Changes to the efficiency and effectiveness of transporting visitors through the park would be obvious. Substantial increases or decreases in the vehicle volumes or passenger volumes on the Park Road could occur. Changes to transportation system costs and/or road traffic conditions would be substantial.

ALTERNATIVE A

Analysis

Alternative A assumes that current conditions would continue, and no changes would be made to the overall Park Road transportation system. Vehicle capacity for the transportation system would remain the same. Vehicle use on the restricted section of the Park Road would continue to be managed to maintain a 10,512 seasonal limit set in the 1986 general management plan and then formalized in regulations in 2000.

The transit service would originate at the Wilderness Access Center and provide access to destinations along the length of the Park Road. The transit bus schedule would be organized to meet demand with a daily limit of

36 buses and would depend on some transit bus seats remaining unsold to allow for hikers and campers boarding west of Savage River to be picked up along the Park Road. The demand on a day during peak season may be more than what is available on a single bus. The number of seats intentionally left empty for hikers and campers boarding west of Savage River may be insufficient by themselves to meet the demands of a busy day during peak season. Alternative A depends on additional transit service seats remaining unsold. Particularly since the time and location of hikers and campers may not necessarily match up to available empty seats, the system has relatively little flexibility for meeting the needs of visitors who board west of Savage if the transit service were suddenly to become busier (HDR 2009).

On the other hand, no visitor has ever been left by the side of the Park Road overnight, and the target of no more than a one-hour eastbound wait time for hikers is written into the concession operating plan. Extra buses are routinely sent out when it is expected that the hiker wait time standard would not be met.

Alternative A would continue to have no self-guided economy tour.

The three tours provided by park concessioners would continue to operate as they do currently. The Tundra Wilderness Tour buses would be assigned based on demand on each day, which, based on 2008 numbers, fluctuated from a minimum of 12 to the daily maximum of 30 provided for in the general management plan. The Tundra Wilderness Tour schedule would remain the same with buses departing in two clusters, one leaving for a 2.5-hour period in the early morning and the other leaving for a 2-hour period in the afternoon that can carry passengers who arrived in Denali on the noon train. Over the years 2006–2008, analysis of actual Tundra Wilderness Tour ridership for the 111-day allocation season shows that almost all available seats were being sold, with some additional vacancy (6%) created by visitors who do not show up for their trip. Data for the analysis came from the Savage River Check Station database and Doyon-ARAMARK Joint Venture Ridership Summaries, 2006–2008 (HDR 2009).

The Denali Natural History Tour buses would also be assigned based on demand on each day, which, based on 2008 numbers, fluctuated from 7 up to the maximum allowed of 23. The Kantishna Experience buses would continue to be offered once or twice per day. Other vehicle use, including those used for Park Service maintenance and operations, professional photography and commercial filming, Kantishna inholder access, Teklanika River Campground access, education groups, and researchers, would continue to be managed as described under alternative A in chapter 2.

From 2007 to 2010, the Denali Park Road Capacity Study has been collecting information for the number of vehicles at wildlife stops on the restricted section of the Park Road, in viewscapes, and at rest areas and visitor centers. The current average number of vehicles stopped at wildlife sightings has ranged from 1.58 to 1.69 over the last four years based on staff observations. These values represent only stops to observe wildlife with at least one vehicle present. In these observations, typically at least 50% of the wildlife stops have only one vehicle present and 75% of the wildlife stops have one or two vehicles present. The maximum number of vehicles reported in staff observations is seven and this value occurs approximately 1% of the time (Phillips et al. 2012).

Teklanika and Toklat are two of the more popular rest areas along the Park Road. Staff observations reported a maximum of 7 buses and 10 total vehicles present at Teklanika at any one time. A maximum of 11 buses and total vehicles were parked at one time at the Toklat Rest Stop. Staff observations at the Eielson Visitor Center reported a maximum of

10 buses and 13 total vehicles present at any one time (Phillips et al. 2010).

Because of the high number of vehicles at some rest areas, wildlife stops, and the Eielson Visitor Center during the peak season, alternative A would not meet the overall planning objectives described in chapter 1 to maximize system flexibility to meet future visitor demand and provide stability and predictability in the system. Transportation system transit bus capacity would be exceeded, and in the case of the Tundra Wilderness Tour, tour bus capacity would also be exceeded some days during the peak season. Changes to the efficiency and effectiveness of transporting visitors through the park would be slight. Some small increases or decreases in the vehicle or passenger volumes on the Park Road would occur. Changes to transportation system costs and/or road traffic conditions would be minimal. Therefore, alternative A would have a localized, long-term, minor, adverse impact on the transportation system.

Cumulative Effects

Past, present, and reasonably foreseeable future actions with the potential to affect the transportation system include past and future road maintenance. Past actions, such as construction of the Eielson Visitor Center, the Toklat Rest Stop, the Savage Rest Stop, and trails; construction of new visitor facilities in the entrance area; rehabilitation of several road segments; and pullout improvements have had local, long-term, moderate, beneficial impacts on the transportation system due to the improvement of transportation facilities and infrastructure.

Past planning efforts, such as the 1997 *Entrance Area and Road Corridor Development Concept Plan*, the *Development Concept Plan for the Park Road Corridor*, and the 1987 Addendum have had local, long-term, moderate, beneficial impacts on the transportation system. Continued implementation of the business plan, the general management plan, road design standards, and the vehicle use on the Park Road regulations also have local, long-term, moderate, beneficial impacts on the transportation system through the implementation of transportation efficiencies prescribed in these plans, standards, and regulations.

The road rehabilitation in the Porcupine Forest section of the Park Road scheduled for 2012 would also have a local, long-term, beneficial impact on the transportation system due to the improvement of transportation infrastructure.

Overall, the local, long-term, minor, adverse impact of alternative A, when combined with the local, long-term, moderate, beneficial impacts of the past, present, and foreseeable future actions would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative A would contribute a small, adverse increment to overall cumulative impacts.

Conclusion

Alternative A would have a local, long-term, minor, adverse impact on the transportation system due to transit bus capacity and Tundra Wilderness Tour bus capacity being exceeded on some days during the peak season due to the existing vehicle limits.

ALTERNATIVE B

Under alternative B, combining transit and a self-guided economy tour, which is described in more detail in chapter 2, would result in some buses operating at near capacity. The transit system/economy tour would begin at the Denali Visitor Center with a park orientation. The transit services would then start at the Wilderness Access Center and provide access to the entire length of the Park Road.

This alternative may require regularly reallocating buses between transit and premium tour services. It may also require reallocating vehicle use between the transportation system and other vehicle use of the Park Road. Reallocation of buses and vehicle use would depend on demand based on the number of reservations and the number of tickets sold daily.

The guided premium tours described in chapter 2 would be available for 100% prebooking for all visitors. The predictability in visitor demand would allow for greater efficiency of bus scheduling and use. The short tour would be offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika); the long tour would be offered to destinations the length of the Park Road. Both tours would allow for flexibility in where the tour begins, either at the Wilderness Access Center or with a pickup at a local hotel.

Larger buses, if determined to not have significant impacts through the proposed study described in chapter 2, could increase the seating capacity of the transportation system.

Other vehicle use, including that associated with NPS staff, professional photographers, commercial filming, Kantishna inholder access, Teklanika River access, and researchers, may be reallocated to benefit the transportation system as described in chapter 2.

Private vehicles used to access Teklanika River would travel westbound on the Park Road during a designated time period. Within 10 years, Teklanika River could become a tents-only campground with visitors using the transportation system for access, further reducing the number of nontransit and nontour vehicles in the park. Transit and tour buses could then replace that number of vehicles.

The traffic model developed by the Minnesota Traffic Observatory (Morris et al. 2010) was used to assess various schedules under alternative B. A sample schedule was found that, based on the model output, could potentially meet all of the standards set for the indicators described in chapter 2. This schedule included 35 transit system / economy tour buses and if this number were run every day of the season, it would result in a 10.5% increase in seat availability over alternative A. The schedule also included 30 short tours per day, with a destination of the Teklanika Rest Stop, and if this number were run every day of the season, it would result in a 30.4% increase in seating capacity compared to the Denali Natural History Tour in alternative A. For the long tour, the schedule accommodated 22 buses per day, with 7 buses going to the Toklat Rest Stop, 13 to the Eielson Visitor Center, and 2 to Kantishna. Again, if this full complement of buses were to be run every day of the season, there would be an 8.2% decrease in seating capacity compared to the Tundra Wilderness Tours and Kantishna Experience in alternative A. Ten lodge buses were included in the daily schedule when running the model, four making day trips and six that started in Kantishna, making round-trips to transport overnight guests. This schedule had a total of 87 concessioner buses (not including lodge buses) departing from the Savage River Check Station every day. In alternative A, the current daily limits would be maintained, which would allow for 89 buses departing from the Savage River Check Station per day (including the Denali Natural History Tour); however, the concessioner cannot run this level of buses per day every day because of the seasonal limits. The average daily concessioner buses under alternative A is 77.

Under alternative B there would not be seasonal limits, so even though the daily limit is lower than alternative A, this sample schedule for alternative B would suggest a 10.7% increase in seat availability as compared to alternative A, with a seasonal daily average of 85 concessioner buses per day.

One limitation of the model is nonbus vehicles—the restriction on these vehicles in alternative B, such as the elimination of RV camping at Teklanika, could not be incorporated (Morris et al. 2010).

The numbers from the modeling should be considered as initial estimates. A more efficient schedule would be achieved as a result of the experience gained through implementation of the model within the flexibility of the adaptive management approach described in chapter 2.

Alternative B would maximize seating on all transit and tour vehicles. The transportation system would be more highly structured. A majority of seats on both transit and tour buses would be filled by prebooking visitors, allowing managers to predict daily vehicle needs and maximize the flexibility of the system to accommodate visitor demand. Alternative B would also maximize the flexibility of the system to accommodate visitor demand and, with the potential use of larger buses, would increase the capacity of the transportation system, resulting in a local, long-term, moderate, beneficial impact on the transportation system.

Cumulative Effects

Past, present, and reasonably foreseeable future actions with the potential to affect the transportation system are the same as described for alternative A.

Overall, the local, long-term, moderate, beneficial impact of alternative B, when combined with the local, long-term, moderate, beneficial impacts of the actions described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative B would contribute a substantial benefit to overall cumulative impacts.

Conclusion

Overall, alternative B would have a local and regionwide, long-term, moderate, beneficial impact on the transportation system and traffic by providing the framework for a modest increase in the seasonal capacity of the transportation system.

ALTERNATIVE C

Under alternative C, a self-guided economy tour would be separate from transit. Offering the two services separately would decrease the number of people on transit buses. The self-guided tours would originate at both the Wilderness Access Center and Denali Visitor Center. Economy tour buses, if seating is available, would pick up eastbound hikers. The creation of a new Wildlife Viewing Subzone 3 (from the Eielson Visitor Center to the Wonder Lake junction) would be managed for the lowest traffic volume on the Park Road.

Transit would begin at the Wilderness Access Center and access the full length of the Park Road. Buses would turn around at various destinations, which may require a change of buses for transit riders traveling farther into the park. For example, the park might consider a loop shuttle between Eielson and Kantishna, such that a transit service originating at the entrance area would only go as far as Eielson and visitors would use the loop shuttle to go farther west. Transit would also provide transportation to the Wilderness Access Center for tour passengers who choose to leave their tour. Transit buses would also pick up hikers. Transit buses would run on a regular schedule to provide a high level of predictability and reliability, and frequency would be scheduled to meet demand.

A variety of premium tours would be developed and would be up to 100% prebooked. Passengers would be picked up at the Wilderness Access Center or at local hotels, providing the same flexibility as in the

alternative A. Premium tours would not pick up hikers.

Vehicle use may be reallocated to benefit the transportation system as described in chapter 2. In this alternative, NPS employees could still use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) during periods of low traffic volume, and the Teklanika River could still be accessed by private vehicles during periods of low traffic volume.

The traffic model developed by the Minnesota Traffic Observatory (Morris et al. 2010) was used to assess various schedules under alternative C. A sample schedule was found that, based on the model output, could potentially meet all of the standards set for the indicators described in chapter 2. This sample daily schedule included 22 transit system buses with destinations of Teklanika, Toklat, or Eielson; and an hourly loop shuttle between the Eielson Visitor Center and Kantishna from 10:00 a.m. to 6:00 p.m. Not including this loop shuttle (because it does not add to the overall visitor capacity of the system), this is a 49.1% decrease in seat availability as compared to the transit system in alternative A. The sample schedule had 16 economy tour buses with destinations of Teklanika and the Eielson Visitor Center. If the transit and economy tour seating capacities are combined, there is a 33.9% increase in seat availability compared to the transit system in alternative A. This sample schedule also included 43 premium tours, with destinations of Teklanika (24), Toklat (5), Eielson Visitor Center (12), and Kantishna (2), and 4 specialty tours with destinations of either Toklat or the Eielson Visitor Center. If the premium tours with a destination of Teklanika are compared to the Denali Natural History Tour in alternative A, there is a 3.8% decrease in seat availability. By combining the remaining premium tours and the specialty tours, there is an 11.6% decrease in seat availability compared to the Tundra Wilderness Tour and Kantishna Experience tours in alternative A. Overall, if the seat availability for the premium and specialty tours of alternative C is compared to the combined seat availability of the Denali Natural History Tour, Tundra Wilderness Tour, and Kantishna Experience of alternative A, there is a 9.2% decrease in premium/specialty seat availability in alternative A. Ten lodge buses were included in the daily schedule when running the model—four making day trips and six that started in Kantishna, making round-trips to transport overnight guests. This schedule had 85 concessioner buses (not including lodge buses) departing from the Savage River Check Station every day. In alternative A, the current daily limits would be maintained, which would allow for 89 buses departing from the Savage River Check Station per day (including the Denali Natural History Tour); however, the concessioner cannot run this level of buses per day every day because of the seasonal limits. The average daily concessioner buses under alternative A is 77. Under alternative C there would not be seasonal limits, so even though the daily limit is lower than alternative A, this sample schedule for alternative C would suggest a 3.8% overall increase in seat availability as compared to alternative A, with a seasonal daily average of 84 concessioner buses per day.

One limitation of the model is how nonbus vehicles are handled; the restriction on these vehicles in alternative C could not be incorporated (Morris et al. 2010).

The numbers from the modeling should be considered as initial estimates. A more efficient schedule would be achieved as a result of the adaptive management approach described in chapter 2.

Alternative C would reduce the modes of transportation, limiting how people can access the park on transit or tour buses, causing modest increases in passenger volumes, which would have a local, long-term, moderate, adverse impact on the transportation system.

Conversely, alternative C would maximize the flexibility of the transportation system described in the planning goals and objectives in chapter 1. The transportation system would need to be reorganized to incorporate self-guided economy tour buses. Different sized buses may need to be acquired to meet the demand of the various premium tours and group size, which would be an additional cost. Alternative C would also require greater coordination of the transit, self-guided tour, and premium tour bus systems. These impacts would be localized, short-term, moderate, and adverse as the transportation system became established. Once established, the transportation system would also have long-term, moderate, beneficial impacts from the increased seating capacity and the variety of loops and tours.

Cumulative Effects

Past, present, and reasonably foreseeable future actions with the potential to affect the transportation system are the same as described in alternative A.

Overall, the impacts of alternative C, when combined with the local, long-term, moderate, beneficial impacts of the actions described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative C would contribute a substantial beneficial increment.

Conclusion

Alternative C would have a local, short-term, moderate, adverse impact on the transportation system due to the need to incorporate a separate self-guided tour bus system, the potential need to acquire different-sized buses to meet the demand of the various premium tours, and the need for increased coordination among transit buses, self-guided tour buses, and premium tour buses. Over the life of this plan, alternative C would have a moderate local and regionwide beneficial impact on the transportation system and traffic by focusing on opportunities for specialty-themed tours, establishing an economy tour, and providing a slight increase to the seasonal capacity of the transportation system.

ALTERNATIVE D

In alternative D, the number of buses per day would be limited to a maximum of 160 vehicles on the restricted section of the road per 24-hour period and the majority of seats within the transportation system would be available for prebooking, resulting in some buses operating at near capacity.

This alternative may require regularly reallocating buses between transit and premium tour services. It may also require reallocating vehicle use between the transportation system and other vehicle use of the Park Road. Reallocation of buses and vehicle use would depend on demand, based on the number of reservations and the number of tickets sold daily, while remaining under the maximum level of 160 vehicles on the restricted section of the road per 24-hour period.

The tour would begin at the Wilderness Access Center and provide access to the entire length of the Park Road.

The guided premium tours described in chapter 2 would be available for prebooking for all visitors. The predictability in visitor demand would allow for greater efficiency of bus scheduling and use. The short tour would be offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika); the long tour would be offered to destinations the length of the Park Road. Both tours would allow for flexibility in where the tour begins, either at the Wilderness Access Center or with a pickup at a local hotel.

Larger buses, if determined to not have significant impacts through the proposed study described in chapter 2, could increase

the seating capacity of the transportation system, so long as it remains below 160 vehicles per 24-hour period on the restricted section of the road.

Other vehicle use, including that associated with NPS staff, professional photographers, commercial filming, Kantishna inholder access, Teklanika River access, and researchers, may be reallocated to benefit the transportation system as described in chapter 2. Depending on traffic levels, private vehicles used to access Teklanika River might be restricted to periods of low traffic volume.

The traffic model developed by the Minnesota Traffic Observatory (Morris et al. 2010) was used to assess various schedules under alternative D. New model simulations were not run to specifically test schedules for alternative D because the transit and tour systems are the same as alternative B, and the model results for alternative B were used as a proxy for alternative D. A sample schedule was found that, based on model output, could potentially meet all of the standards set for the indicators described in chapter 2. This schedule included 35 transit system / economy tour buses and if this number were run every day of the season, it would result in a 10.5% increase in seat availability over alternative A. The schedule also included 30 short tours per day, with a destination of the Teklanika Rest Stop, and if this number were run every day of the season, it would result in a 30.4% increase in seating capacity compared to the Denali Natural History Tour in alternative A. For the long tour, the schedule accommodated 22 buses per day, with 7 buses going to the Toklat Rest Stop, 13 to the Eielson Visitor Center, and 2 to Kantishna. Again, if this full complement of buses were to be run every day of the season, there would be an 8.2% decrease in seating capacity compared to the Tundra Wilderness Tours and Kantishna Experience in alternative A. Ten lodge buses were included in the daily schedule when running the model, four making day trips and six that started in Kantishna, making round-trips to transport overnight guests. This schedule had 87 concessioner buses (not including lodge buses) passing through the Savage River Check Station every day. In alternative A, the current daily limits would be maintained, which would allow for 89 buses departing from the Savage River Check Station per day (including the Denali Natural History Tour); however, the concessioner cannot run this level of buses per day every day because of the seasonal limits. The average daily number of concessioner buses under alternative A is 77.

The sample schedule for alternative D would suggest a 10.7% increase in seat availability as compared to alternative A.

The numbers from the modeling should be considered as initial estimates. A more efficient schedule would be achieved as a result of the experience gained through implementation of the model within the flexibility of the adaptive management approach described in chapter 2.

Alternative D would maximize seating on all transit and tour vehicles. The transportation system would be more highly structured and with the combination of the daily maximum level of buses and the adaptive management system, there would be a high level of stability and predictability in the system. A majority of seats on both transit and tour buses would be filled by prebooking visitors, allowing managers to predict daily vehicle needs and maximize the flexibility of the system to accommodate visitor demand. Alternative D would also maximize the flexibility of the system to accommodate visitor demand and, with the potential use of larger buses, would increase the capacity of the transportation system, resulting in a local, long-term, moderate, beneficial impact on the transportation system.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to affect the

transportation system are the same as described for alternative A.

Overall, the local, long-term, moderate, beneficial impact of alternative D, when combined with the local, long-term, moderate, beneficial impacts of the actions described above would result in local, long-term, moderate, beneficial impacts on the transportation system. Alternative D would contribute a substantial benefit to overall cumulative impacts.

Conclusion

Overall, alternative D would have a local and regionwide, long-term, moderate, beneficial impact on the transportation system and traffic by providing the framework for a modest increase in the seasonal capacity of the transportation system.

WILDLIFE AND WILDLIFE HABITAT

METHODOLOGY AND ASSUMPTIONS

The effects of implementing the various management alternatives on wildlife and wildlife habitat are analyzed in this section. The impact intensity thresholds, analyses, and conclusions in this section apply to all wildlife species and habitat along the road corridor, as described in chapter 3. Given the diversity and abundance of wildlife species along the Park Road corridor, and the relative similarity of potential effects from the four alternatives, the following impact analyses are discussed and measured on a habitat basis instead of a species basis.

The analysis is primarily presented qualitatively rather than quantitatively because of the conceptual nature of the alternatives. The planning team based the wildlife impact analyses and conclusions in this section on professional judgment, information provided by NPS experts, park staff insights, and a review of existing literature and studies.

Measure

The analysis of the effects of the alternatives on the five large mammal species and other wildlife (e.g., avian and small mammal species) is based on the importance of affected habitat type, habitat location, and changes in habitat quality. The changes in habitat quality for various wildlife species could result in changes in the animals' behavior, population trends, movement or migration patterns, and the potential for habituation to humans.

Intensity Definitions

Minor. Effects on wildlife and wildlife habitat quality would not be outside the natural range of variability and would not have any notable effects on the wildlife species or the natural processes sustaining their habitat. The effects could result in minimal changes to habituation to humans and would not affect the regional population of the species.

Moderate. Effects on wildlife and wildlife habitat quality would cause changes to the animals' feeding, mating, and caring for young. The effects could intermittently be outside the natural range of variability. Some limited changes to habituation to humans would be expected. Changes to the regional species population would be minimal, but some changes to localized populations of some species may be apparent and measurable.

Major. Effects on wildlife and wildlife habitat quality would cause substantial changes to the animals' behavior (feeding, mating, migration, and caring for young). The effects would be outside the natural range of variability. Distinct changes to habituation to humans would be expected. Changes to regional species population would be apparent, and changes to localized populations of multiple species would be apparent and measurable.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Analysis

Under alternative A, the transportation system on the Park Road would continue to be managed to maintain the previously set 10,512-vehicle-per-year maximum and to provide the current offerings of tours and off-bus activities. This continued operation would maintain the average of about 83 total buses per day throughout the visitation season (concessioner and lodge buses). The system volume on the Park Road could be expected to peak at about 91 total buses per day during

mid-summer months, but only reach about 71 total buses per day through the first week of June during the spring shoulder season. Under alternative A, the highest level of bus traffic would continue to occur during the peak hours of the day (late morning through mid-afternoon), with notably lower traffic volumes in the shoulder periods of the day (early to mid-morning and late afternoon through evening).

The vehicle traffic and off-bus human activity along the Park Road that would result from the implementation of alternative A would continue to have a variety of effects on wildlife and wildlife habitat along the Park Road corridor. Adverse effects such as increased stress in individuals, habitat fragmentation, and disturbances to foraging, movement, or caring for the young would continue to occur.

For example, as noted in chapter 3, recent NPS Dall sheep monitoring indicates that sheep generally move farther away from the road as traffic volume increases, which affects sheep behavior, such as foraging (Putera and Keay 1998). Similarly, another NPS study of grizzly bears along the Park Road revealed that bears tend to move faster when crossing the road (relative to immediately before and after the crossing) and that bears tend to rest in an inactive state for longer periods farther from the road. These results indicate possible increases in stress on the animals, and that bears might not be comfortable enough to rest for long periods near the road (Mace et al. 2012).

Other wildlife studies along the Denali Park Road have suggested that these road use effects on wildlife may be more limited than they were in the past (e.g., early 1970s). However, it is important to note that this observation could result from individual animals becoming habituated to human or vehicle presence along the road corridor over the years (Burson et al. 2000). For example, the Mace et al. 2012 study reports that there was a significant correlation between higher traffic on the road and an increased level of grizzly bears crossing the road. If the animals are not subjected to a negative reinforcement from the stimuli (e.g., the vehicle traffic), they may become habituated to, or more accepting of, the stimuli over time (Burson et al. 2000). Thus, monitoring the movement and behavior of habituated individuals may not reveal other adverse effects on wildlife individuals or species that avoid the road corridor during high-use periods.

Ample research and documented principles of wildlife biology support the conclusion that human activity along the Park Road has overall adverse effects on wildlife and wildlife habitat. Disturbances to wildlife habitat from active human uses can have both immediate impacts and long-lasting, or permanent, adverse impacts on wildlife. For example, the immediate response of many animals to human disturbances, such as vehicle traffic or off-bus human activity, often involves a change in behavior, such as fleeing, a cessation of foraging, or altering reproductive behavior (Taylor and Knight 2003; Knight and Cole 1991). Over time, the cumulative energy losses from these ongoing disturbance reactions and/or the resulting increased stress levels come at the cost of energy resources needed for an individual's survival, growth, and reproduction (Geist 1978).

Additionally, if multiple wildlife individuals of a species burn energy to respond to human or vehicle disturbances or actively avoid areas of their normal range due to human activity (e.g., road corridor and transportation nodes), this energy and habitat loss can affect the overall carrying capacity of the habitat (Taylor and Knight 2003; Stalmaster 1983).

As it relates to alternative A, individual vehicles and/or queues of multiple vehicles along the Park Road would continue to adversely affect wildlife behavior, movement, or stress levels. Both moving vehicles and parked vehicles would continue to have adverse effects. Some wildlife that become stressed from human or vehicle presence along the road would continue to be forced to

burn energy to avoid the disturbances or the road corridor entirely. The stressed wildlife could also alter their preferred movement and migration route across or through the road corridor and could also forgo ideal foraging or resting areas. In most cases, these effects would be greatest during the peak hours of the day, when vehicle traffic on the Park Road is highest (e.g., late morning through mid-afternoon).

While some individual animals would continue to be adversely affected by avoiding the vehicle and human disturbances in the corridor, other individual animals would continue to become habituated to human/vehicle presence. On the surface, this effect does not appear adverse because the animals are not displaced or flushed from their preferred foraging areas, resting areas, or migration routes. However, habituation to humans can be a very adverse effect on wildlife (and humans), particularly if the wildlife individuals encounter human activity in other areas of the park or beyond park boundaries.

In addition to the effect of vehicles on wildlife, some wildlife and wildlife habitat would continue to be adversely affected by off-bus visitor activities at the transportation nodes along the full length of the Park Road. Some examples of these impacts are noise, vegetation trampling, social trails, and human presence seen or smelled by wildlife.

Under alternative A, these impacts from off-bus activities would continue to be limited to areas around the developed transportation nodes along the road, per the 2006 *Backcountry Management Plan*. Alternative A would also maintain the current management zones as defined by the 1997 *Entrance Area and Road Corridor Development Concept Plan*. These management zones could allow some increases in vehicle use and transportation system development between Eielson and Wonder Lake—currently a less developed segment of the road corridor.

Also, under alternative A, the professional photography permit program would continue to allow five road permits per day for private photography vehicles via a lottery system. The park's commercial filming program would also grant a discretionary number of special use permits (independent of photography permitting). In addition to adding to the Park Road's overall traffic volume, the private vehicles associated with photography and filming could be parked along the Park Road corridor for lengthy periods of time. This could continue to result in prolonged disturbances and impacts on wildlife behavior, movement, and stress levels.

To help assess visitor experience and resource conditions, park staff would continue to conduct random, informal visitor surveys and resource monitoring (e.g., wildlife monitoring) under alternative A. However, these efforts would not be part of a formalized quantified adaptive management program, even though continuing research into quiet night effects and sheep crossing problems may initiate changes to the traffic limits.

All of the above effects would continue under alternative A. Overall, the continued vehicle use on the Park Road and associated human activity under alternative A would continue to have a long-term, moderate, adverse, and local impact on wildlife and wildlife habitat along the Park Road corridor. These impacts would continue to occur each year during the visitation season, and would include disturbances to wildlife feeding, mating, caring for young, and/or movement. The effects would result in some individual animals becoming more habituated to humans and changes to localized populations of some species. The alternative would only have negligible effects on regional species populations.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the

vicinity of the Park Road corridor have had, and would continue to have, notable effects on the wildlife and wildlife habitat in the area. Many of these projects and actions are implemented by the Park Service, while others are implemented by other federal, state, and local agencies, as well as other private entities and individuals.

As land development and human activity continues to occur within and outside the park, additional impacts on wildlife are likely to occur. Private land development along Alaska Highway 3 in Healy, Nenana Canyon, and Cantwell will continue to displace and fragment large mammal habitat areas and migration corridors along the park's eastern boundary. Tourism-related commercial development in the area will likely continue to introduce higher levels of visitation in the park and on surrounding lands, which will increase adverse noise and disturbance impacts on large mammals. Sport hunting and other backcountry recreational activities on lands adjacent to the park will continue to affect wildlife that inhabit the park as well. Subsistence hunting and trapping, including the potential use of off-road vehicles for subsistence uses, would also result in adverse impacts on wildlife and wildlife habitat in the area due to short-term and localized reductions in populations of some species. Permitted motorized uses in isolated areas (e.g., Kantishna Hills), can also cause noise and other human disturbances that have adverse impacts on wildlife behavior, movement, or stress levels.

Various local recreation development and maintenance projects along the Park Road corridor have and will continue to displace and disturb areas of habitat along the corridor. Park campground use, activity at Kantishna lodges, and rest area development result in areas of habitat displacement and expanded nodes of increased human activity and noises. Projects and actions related to Park Road development and maintenance also have adverse impacts on wildlife and wildlife habitat by introducing short-term construction noise impacts and displacing relatively small areas of habitat. Examples of such projects and actions include the intervisible pullout project (between miles 73 and 86), the gravel acquisition plan, and regular Park Road maintenance. Also, the 1983 *Development Concept Plan* (and addendum of 1987) for the Park Road corridor prompted a variety of projects that expanded visitation and maintenance facilities along the corridor.

The above-mentioned actions and projects generate noise, human activity, and/or land development that result in a direct loss of wildlife habitat, behavioral changes in wildlife, or fragmented migration routes of Denali wildlife. However, some of these adverse impacts on large mammals in Denali National Park and Preserve are partially offset by beneficial impacts of other projects and actions. For example, the park's general management plan and backcountry management plan included many provisions that help minimize adverse impacts on wildlife from recreational uses in the park. These plans promote the use of a limited-access transportation system and a reduction in private vehicle traffic on the Park Road. These plans also establish and maintain a "no formal trail" policy for Denali Wilderness units. The park also has several past and future projects and plans that expand visitor education facilities and programs. With proper educational opportunities for park users, some visitation-related wildlife disturbances can be minimized or avoided. Also, the park's road design standards, which dictate how the historic Park Road will be maintained, provide limitations on additional road development and widening.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wildlife and wildlife habitat in the park.

When the likely effects of the actions in alternative A are added to the effects of the

other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat. Alternative A would contribute a long-term, medium, adverse increment to this cumulative impact.

Conclusion

The continued implementation of alternative A would result in local, long-term, moderate, adverse impacts on wildlife and wildlife habitat. These effects would primarily result from moving and parked vehicles along the Park Road and off-bus human activity at transportation nodes. The effects would have adverse impacts on wildlife behavior and habitat use, movement, and stress levels.

ALTERNATIVE B

Analysis

Under alternative B, vehicle travel and off-bus visitor use along the Park Road would continue. This vehicle traffic and human activity would continue to have a variety of notable adverse effects on wildlife and wildlife habitat along the road corridor similar to the effects described in the analysis of alternative A.

Individual vehicles and/or queues of multiple vehicles (moving or parked) along the road would continue to adversely affect wildlife behavior, movement, and/or stress levels. Some individual animals would avoid the disturbance areas along the Park Road, while others would continue to become habituated to human presence. Also, other habitat degradation would continue from effects such as vegetation trampling and development of social trails in areas around transportation nodes.

Under alternative B (and as in alternative A), the impacts from off-bus activities would continue to be limited to areas around the developed transportation nodes along the road, per the 2006 *Backcountry Management Plan.*

The locations of these wildlife behavior and movement impacts from vehicle use and human activity along the Park Road would be different for large mammal species. The potential for effects would be greatest for the following species in the following locations:

- **Dall sheep**: between Igloo Creek and Polychrome Overlook, which is the area of highest sheep concentration along the Park Road corridor
- **caribou**: between Polychrome Overlook and Wonder Lake, which is the area along the road corridor that typically has the highest caribou concentration during the park visitation season
- **grizzly bear**: between Igloo Creek and Eielson, which is the area of highest bear concentration along the Park Road corridor
- **gray wolf**: between Savage River and Sanctuary River, at Igloo Creek, and between the Polychrome Overlook and Highway Pass, which are areas with relatively high wolf concentrations and den activity
- **moose**: along the eastern segments of the Park Road up to Sanctuary River, which is the largest area of the high moose concentration along the Park Road corridor; between Igloo Creek and Polychrome Overlook; and between Eielson and Wonder Lake

Although there would be similarities with alternative A, alternative B would involve multiple changes to the management of the transportation system on the Park Road (compared to alternative A). As a result, some

of the effects on wildlife may be different from those under alternative A.

According to transportation models for alternative B, the total seasonal bus volume on the road could increase by 10.2% should the demand exist (assuming full schedules per day). Similarly, modeling suggests that the daily full schedule bus volume on the road could reach about 97 buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of as many as 100 buses under alternative A. However, for concession buses only, the average daily number of buses under alternative A is 77, compared to the average daily number that could be allowed under alternative B, which is 85.

These increases from current vehicle traffic levels under alternative B have the potential to increase the adverse effects on wildlife in some areas and during certain times of day. For example, both the estimated 10.2% increase in seasonal bus volume and the respective increases in average daily volumes could generate more overall noise and visual disturbances to wildlife along the corridor throughout the season. However, some of these potential increases in wildlife impact would be mitigated or avoided by using adaptive management measures, which are discussed later in this "Analysis" section.

Alternative B may realize higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A). This potential shoulder season traffic increase could adversely affect the seasonal behavior of some wildlife species. For example, this anticipated increase in shoulder season traffic would occur during a period when Dall sheep typically cross the Park Road more frequently and vegetation "green up" has not yet occurred in the higher elevations along the road corridor. The springtime traffic increase could cause sheep to move away from the road and, thus, reduce their access to available foraging habitat (Phillips et al. 2010).

The transportation model for alternative B indicates this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wildlife during peak hours, the increased bus activity during mornings and evenings would increase disturbances to wildlife habitat in these shoulder periods. Therefore, this effect would extend the overall daily duration of notable levels of wildlife disturbance and reduce the amount of "downtime" for wildlife to be free from bus and human disturbances.

In addition, alternative B would include enhancements of premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could disturb wildlife behavior and movement near the various transportation nodes.

Under alternative B, professional photographers and commercial filming activity would continue to have adverse effects on wildlife and wildlife habitat along the road corridor. However, the photography and filming permit programs would merge under this alternative. A maximum total of two permits per day would be issued. This permitting allowance is a decrease from the allowance in alternative A, which would continue to allow five photography permits per day and additional/separate filming permits. This change would result in a reduction of impacts on wildlife behavior and movement from these uses due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road.

As with alternative A, alternative B would maintain the current road corridor management zones (per the 1997 *Entrance Area and Road Corridor Development Concept*

Plan). This continued management zoning could allow for future growth in vehicle use west of Eielson to Wonder Lake. As a result, this could result in future increases in disturbances to wildlife behavior and movement in the western portions of the road corridor. With the anticipated tour system under alternative B, the traffic volumes west of Eielson would likely be higher than under alternative A.

The degree of adverse effects from traffic west of Eielson would vary for the large mammal species. This traffic increase would affect caribou and moose the most since this segment of the Park Road runs through high summer concentration areas for these species. Effects on Dall sheep, grizzly bears, and gray wolves would be more limited because concentrations of these species are fairly low along the Park Road between Eielson and Wonder Lake.

Alternative B includes premium short tours that would primarily terminate and turn around at Teklanika. Thus, under this alternative, the Teklanika transportation hub would likely experience an increase in off-bus visitor activity, which could introduce higher levels of human activity and noise in an area that has a relatively high wolf concentration and den activity (between Teklanika and Igloo Creek), and a relatively high moose concentration.

Under alternative B private vehicles that access the Teklanika River Campground would be required to travel westbound only during designated low traffic time periods. Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this action would likely reduce overall peak traffic volumes. This could reduce disturbances to wildlife behavior and movement during the times of day when the highest levels of habitat disturbance occur in the area between the park entrance and Teklanika. Conversely, this action would also increase disturbances to wildlife behavior during the periods of relatively low levels of habitat disturbance (i.e., off-peak hours). Again, the area affected would be between the park entrance and Teklanika. In addition to introducing adverse impacts on wildlife during off-peak periods, this alternative could lead to an increase in nighttime traffic.

Under alternative B, the Teklanika River Campground would phase into a tents-only camping area within 10 years of plan implementation. When this occurs, visitors would be required to use the transportation system for campground access, which would likely reduce the number of private vehicles on the road and would reduce traffic volumes. This would benefit wildlife and wildlife habitat.

The locations of these adverse and beneficial wildlife impacts from changes in private vehicle use at and to the Teklanika River Campground would vary for the large mammal species. The potential for effects would be greatest for the following species in the following locations:

- **gray wolf**: between Savage River and Sanctuary River, which is an area with relatively high wolf concentrations and den activity
- **moose**: along the eastern segments of the Park Road up to Sanctuary River
- **Dall sheep, caribou, and grizzly bear**: limited impacts because concentrations of these species are relatively low along the Park Road east of Teklanika

In addition to the benefit provided by making the Teklanika River Campground a tents-only facility, alternative B includes several other measures that would benefit wildlife and wildlife habitat along the Park Road corridor.

First, vehicles and visitation would be managed to meet desired conditions of natural resources, such as wildlife, by using indicators

and standards and adaptive management actions.

The proposed indicators and standards that would affect wildlife and wildlife habitat conditions include

- sheep gap spacing,
- nighttime traffic levels, and
- number of vehicles at wildlife viewing stops.

These standards would help park staff determine if and when vehicle use conditions might be negatively affecting wildlife movement and behavior.

For example, the use of the sheep gap spacing indicator and standard would help ensure that large mammals of the park would be given an adequate amount of time between vehicles to cross the Park Road in an uninhibited, undisturbed manner. The nighttime traffic level indicator and standard would help minimize disturbances to wildlife and wildlife habitat during off-peak hours, which would also help minimize negative effects on their behavior and movement the following morning. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also have beneficial effects on wildlife and wildlife habitat because it could help control and minimize the amount of human activity in the proximity of wildlife individuals along the road corridor.

The indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered that would help avoid further adverse impacts on wildlife and wildlife habitat.

In addition to the monitoring done for the indicator and standards, alternative B would include provisions for additional comprehensive monitoring of natural resource variables along the Park Road corridor. This additional monitoring would involve ongoing wildlife population and distribution monitoring programs in the park. If adverse effects on wildlife populations, distributions, or behavior are observed via these comprehensive monitoring efforts, NPS staff would consider applying one or more management measures to mitigate these impacts.

Also, under alternative B, NPS staff would complete multiple BACI analyses to detect changes in resource conditions over time. The BACI study principles would be applied to the park's transportation system by monitoring resource conditions in two similar locations, both before and after an action/disturbance has been introduced at one of the two locations. The resulting changes in resource conditions at each location would then be compared against each other to help discern impact cause-and-effect. Alternative B would include BACI study monitoring for the following:

- distribution, number and types of wildlife sightings along the road
- timing and location of Dall sheep and grizzly bear road crossings
- grizzly bear and Dall sheep movement rates across or near the Park Road
- distribution of bear inactive periods relative to the road
- probability and timing of Dall sheep road crossings

Like other forms of comprehensive monitoring of resources, the completion of BACI analyses would help inform park staff of possible changes in wildlife habitat conditions that result from road use, which would initiate discussions on how to mitigate the impacts through various management measures.

Although alternative B is projected to involve a seasonal increase and average daily increases in total bus volumes on the Park Road (assuming a full schedule), comprehensive resource monitoring and adaptive management measures would be used to help prevent the potential adverse effects on wildlife. With these efforts in place, it is possible for the increases in vehicle volumes to occur while still limiting adverse effects on wildlife.

While the above-mentioned adaptive management and transportation system adjustments of this alternative would benefit grizzly bears and their habitat, some changes to the male and female distribution of grizzly bear activity along the Park Road corridor may also occur as a result of this alternative. As noted in chapter 3, bear monitoring evidence indicates that a higher level of female grizzly bear activity exists closer to and along the road corridor (compared to male bear activity). Given this dichotomy, it is possible that female bears use the vehicle disturbances along the road as a buffer from the male bear threat to bear cubs. Therefore, if vehicle impacts on large mammal movement are reduced by the adaptive management and transportation system changes in alternative B, the possibility for an increase in male bear activity closer to the Park Road also exists. If this male bear distribution shift occurs, some changes could result in female distribution and/or cub mortality.

Under alternative B, NPS staff and their guests would be required to use an employee shuttle system for all personal travel along the Park Road. This action would reduce the overall number of private vehicles on the Park Road and would reduce vehicle volumes during peak traffic periods. In turn, this result would minimize vehicle effects on wildlife behavior and movement.

With the combined transit and self-guided tour bus system of alternative B functioning on a set schedule, some large mammals could habituate to the consistent patterns of bus traffic on the road. This effect would be similar to the bus patterns that would continue under alternative A, and would benefit wildlife behavior and movement.

Overall, despite the measures under alternative B that would help minimize impacts on wildlife, continued and increased vehicle use on the Park Road and associated human activity, including off-bus activities at transportation nodes, would have a long-term, moderate, adverse, and localized impact on wildlife and wildlife habitat along the Park Road corridor. These impacts would occur each year during the visitation season, and would include disturbances to wildlife feeding, mating, caring for young, and/or movement. The effects would result in some individual animals becoming more habituated to humans and changes to localized populations of some species. The alternative would only have minimal effects on regional species populations. However, when compared to alternative A, this alternative would likely reduce adverse impacts on wildlife and wildlife habitat. This reduction would be due to actions such as improving habitat monitoring and using adaptive management measures, and the potential for modifications in private vehicle use that would minimize road traffic during peak hours (e.g., park staff vehicles, photographers and filming crews, and visitors to the Teklanika River Campground). However, while the adaptive management measures would likely reduce wildlife impacts during daily peak hours and accommodate an increase in seasonal bus volumes, this alternative would likely increase adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons when compared to alternative A.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had, and will have, notable effects on wildlife and

wildlife habitat in the area. These projects and actions are described and summarized in the "Alternative A" section above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, and local to regionwide adverse impacts on wildlife and wildlife habitat in the park.

When the effects of alternative B actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat. Alternative B would contribute a medium, long-term, adverse increment to this cumulative effect.

Conclusion

Alternative B would have a long-term, moderate, adverse, and local effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and probably increased, number of vehicles (moving or parked) on the Park Road and associated increases in off-bus human activity at transportation nodes. This impact includes the likely increase in adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons due to increased traffic during those periods. The effects would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as comprehensive monitoring programs and adaptive management measures (e.g., use of indicators and standards and BACI studies) and reductions in private vehicle use.

ALTERNATIVE C

Analysis

Under alternative C, vehicle travel and off-bus visitor use along the Park Road would continue. This vehicle traffic and human activity would continue to have a notable adverse effect on wildlife and wildlife habitat along the road corridor. The types of continued impacts and disturbances to wildlife habitat from vehicles and humans would be similar to those described in the analysis of alternative A.

Individual vehicles and/or queues of multiple vehicles (moving or parked) along the road would continue to adversely affect wildlife behavior, movement, and stress levels. Some individual animals would avoid the disturbance areas along the Park Road, while others would continue to become habituated to human presence. Also, other habitat degradation would continue from effects such as vegetation trampling and the development of social trails in areas around transportation nodes.

Under alternative C (as in alternative A), the impacts from off-bus activities would continue to be limited to areas near the developed transportation nodes along the road, per the 2006 *Backcountry Management Plan*.

The locations of above-mentioned wildlife behavior and movement impacts from vehicle use and human activity along the Park Road would be different for large mammal species. The potential for effects would be in the same locations and with the same intensity as listed for alternative B.

Alternative C would also involve multiple changes to the management of the transportation system on the Park Road (compared to alternative A). As a result, some of the effects on wildlife may be different from those under alternative A.

According to transportation models for alternative C, should the demand exist, the total seasonal bus volume on the road could increase by 8.7% (assuming full schedules per day). The daily full schedule bus volume on the road could reach about 95 buses per day

(concessioner and lodge buses), which is comparable to the summer peak day volume that can be as high as 100 under alternative A. However, for concession buses only, the average daily number of buses under alternative A is 77, compared to the average daily number that could be allowed under alternative C, which is 84.

These increases in vehicle traffic levels under alternative C have the potential to increase the adverse effects on wildlife in some areas and during certain times of day. For example, the estimated 8.7% increase in seasonal bus volume and the respective increases in average daily volumes could generate more overall noise and visual disturbances to wildlife along the corridor throughout the season. However, some of these potential increases in wildlife impacts would be mitigated or avoided by using adaptive management measures, which are discussed later in this "Analysis" section.

Alternative C may realize higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A). This potential shoulder season traffic increase could adversely affect the seasonal behavior of some wildlife species. For example, this anticipated increase in shoulder season traffic would occur during a period when Dall sheep typically cross the Park Road more frequently and vegetation "green up" has not yet occurred in the higher elevations along the road corridor. The springtime traffic increase could cause sheep to move away from the road and, thus, reduce their access to available foraging habitat (Phillips et al. 2010).

The transportation model for alternative C indicates this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wildlife during peak hours, the increased bus activity during mornings and evenings would increase disturbances to wildlife habitat in these shoulder periods. Therefore, this would extend the overall daily duration of notable levels of wildlife disturbance and reduce the amount of "downtime" for wildlife to be free from bus/human disturbances.

Due to the expanded ability of the transit system to pick up hikers under alternative C, visitors would have more confidence in that service and, therefore, would have more freedom to change their travel plans and destinations by getting off and reboarding transit buses along the length of the Park Road. If visitors take advantage of this increased independence and flexibility, an increase in off-bus, unguided, human activity might occur at or around the transportation nodes along the full length of the road. If this happens, an increase in dispersed human activity such as day hiking and associated impacts on wildlife behavior, movement, and stress levels could result (e.g., from off-trail vegetation trampling, increase in noises, and dispersion of human activity farther out in the landscape around transportation nodes).

Alternative C would include enhancements of premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could disturb wildlife behavior and movement in the vicinity of the transportation nodes.

Also, under alternative C, professional photographers and commercial filming activity would continue to have adverse effects on wildlife and wildlife habitat along the road corridor. However, the photography and filming permit programs would merge under this alternative. Up to three permits would be made available for the entire Park Road per day. This permitting allowance is a decrease from alternative A, which would continue to allow up to five photography permits per day and additional separate filming permits. This alternative would reduce

human disturbances to wildlife behavior and movement due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road.

Under alternative C, private vehicles that access the Teklanika River Campground would be required to travel westbound only during designated low traffic time periods. Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this action would likely reduce overall peak traffic volumes. This could reduce disturbances to wildlife behavior and movement during the times of day when the highest levels of habitat disturbance occur in the area between the park entrance and Teklanika. Conversely, this action would also increase disturbances to wildlife behavior during the periods of low levels of habitat disturbance (i.e., off-peak hours). In addition to introducing adverse impacts on wildlife during off-peak periods, this alternative could lead to an increase in nighttime traffic.

The degree and locations of these wildlife impacts from changes in private vehicle use at and to the Teklanika River Campground would vary for the large mammal species. The potential for effects would be greatest for the following species in the following locations:

- **gray wolf**: between Savage River and Sanctuary River, which is an area with fairly high wolf concentrations and den activity
- **moose**: along the eastern segments of the Park Road up to Sanctuary River
- **Dall sheep, caribou, and grizzly bear**: effects would be limited because concentrations of these species are fairly low along the Park Road east of Teklanika

Alternative C includes various measures that would benefit wildlife and wildlife habitat along the Park Road corridor.

First, vehicles and visitation would be managed to meet desired conditions of natural resources, such as wildlife, through the use of indicators and standards and adaptive management actions.

The proposed indicators and standards that would affect wildlife and wildlife habitat conditions include

- sheep gap spacing
- nighttime traffic levels
- number of vehicles at wildlife viewing stops

These standards would help park staff determine if and when vehicle use conditions negatively affect wildlife movement and behavior.

The use of the sheep gap spacing indicator and standard would help ensure that large mammals of the park would be given an adequate amount of time between vehicles to cross the Park Road in an uninhibited, undisturbed manner. The nighttime traffic level indicator and standard would help minimize disturbances to wildlife and wildlife habitat during off-peak hours, which would also help minimize negative effects on their behavior and movement the following morning. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors, it could also have beneficial effects on wildlife and wildlife habitat because it could help control and minimize the amount of human activity in the proximity of wildlife individuals along the road corridor.

These indicators would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive

management action would be triggered that would help avoid further adverse impacts on wildlife and wildlife habitat. Another possible outcome of managing the vehicle use to these indicators and standards could be a more set traffic pattern on the Park Road, which could also have beneficial effects on wildlife and wildlife habitat.

In addition to the monitoring done for the indicator and standards, alternative C would include provisions for additional comprehensive monitoring of natural resource variables along the Park Road corridor. This additional monitoring would involve ongoing wildlife population and distribution monitoring programs in the park. If adverse effects on wildlife populations, distributions, or behavior are observed via these comprehensive monitoring efforts, NPS staff would consider applying one or more management measures to mitigate these impacts.

Also, under alternative C, NPS staff would complete multiple BACI analyses to detect changes in resource conditions over time. The BACI study principles would be applied to the park's transportation system by monitoring resource conditions in two similar locations, both before and after an action/disturbance has been introduced at one of the two locations. The resulting changes in resource conditions at each location would then be compared to help discern impact cause-and-effect. Alternative C would include BACI study monitoring for the following:

- distribution, number, and types of wildlife sightings along the road
- timing and location of Dall sheep and grizzly bear road crossings
- grizzly bear and Dall sheep movement rates across or near the Park Road
- distribution of bear inactive periods relative to the road
- probability and timing of Dall sheep road crossings

Like other forms of comprehensive monitoring of resources, the completion of BACI analyses would help inform park staff of possible changes in wildlife habitat conditions that result from road use, which would initiate discussions on how to mitigate the impacts through various management measures.

Although alternative C is projected to involve a seasonal increase and average daily increases in total bus volumes on the Park Road (assuming a full schedule), comprehensive resource monitoring and adaptive management measures would be used to help prevent the potential adverse effects on wildlife. With these efforts in place, it is possible for the increases in vehicle volumes to occur while still limiting adverse effects on wildlife.

While the above-mentioned adaptive management and transportation system adjustments would benefit grizzly bears and their habitat, some changes to the male and female distribution of grizzly bear activity along the Park Road corridor may also occur as a result of this alternative. As noted in chapter 3, bear monitoring evidence indicates that a higher level of female grizzly bear activity exists closer to and along the road corridor than male bear activity. Given this dichotomy, it is possible that female bears use the vehicle disturbances along the road as a buffer from the male bear threat to bear cubs. Therefore, if vehicle impacts on large mammal movement are reduced by the adaptive management and transportation system changes in alternative C, the possibility for an increase in male bear activity closer to the Park Road also exists. If this male bear distribution shift occurs, some changes could result in female distribution and/or cub mortality.

With the transit bus system of alternative C functioning on a set schedule, some large mammals could habituate to the consistent patterns of bus traffic on road. This effect would be similar to the bus patterns that would continue under alternative A, and

would be a benefit to wildlife behavior and movement.

Unlike alternative A, alternative C includes the creation of a new Wildlife Viewing Subzone 3 between Eielson Visitor Center and Wonder Lake. This new zone would be managed for the lowest traffic volume on the Park Road and would not allow notable volume/use growth beyond current conditions. As a result, disturbances to wildlife behavior and movement along the road corridor could be minimized more than alternative A due to lower traffic volumes and associated disturbances (e.g., noise, inhibited road crossing, off-bus human activities, and facilities development). Unlike alternative A, the new Wildlife Viewing Subzone 3 under alternative C would help ensure future limitations to road use and traffic volumes in this western segment of the Park Road.

The degree of beneficial effects from the new Wildlife Viewing Subzone 3 would vary for the large mammal species. This alternative would affect caribou and moose the most since this segment of the Park Road runs through high concentration areas for these species during the summer months. Effects on Dall sheep, grizzly bears, and gray wolves would be more limited because concentrations of these species are fairly low along the Park Road between Eielson and Wonder Lake.

Under alternative C, NPS staff could continue to use private vehicles (and employee guests could travel with them). However, this vehicle use on the Park Road would only be allowed during low traffic volume periods. During high traffic volume periods, NPS staff and guests would need to use the transit system. This adjustment of staff vehicle travel times would reduce road traffic during peak hours and reduce vehicle effects on wildlife behavior and movement (except during low traffic periods).

Overall, despite these measures under alternative C that would help minimize impacts on wildlife, continued vehicle use on the Park Road and associated human activity, including off-bus activities around transportation nodes, would have a long-term, moderate, adverse, and localized impact on wildlife and wildlife habitat along the Park Road corridor. These impacts would occur each year during the visitation season, and would result from disturbances to wildlife feeding, mating, caring for young, and movement. The effects would result in some individual animals becoming more habituated to humans and changes to localized populations of some species. The alternative would only have minimal effects on regional species populations. However, when compared to alternative A, this alternative would reduce adverse impacts on wildlife and wildlife habitat from actions such as improving habitat monitoring and protection along the road via the use of adaptive management measures, the establishment of a more protective management zone between Eielson and Wonder Lake, and the potential for modifications in private vehicle use that would minimize road traffic during peak hours (e.g., park staff vehicles, photographers and filming crews, and visitors to the Teklanika River Campground). However, while the adaptive management measures would likely reduce wildlife impacts during daily peak hours and accommodate an increase in seasonal bus volumes, this alternative would likely increase adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons compared to alternative A.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had, and would continue to have, notable effects on the wildlife and wildlife habitat in the area. These projects and actions are described and summarized in the “Alternative A” section above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wildlife and wildlife habitat in the park.

When the likely adverse and beneficial effects of alternative C are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat. Alternative C would contribute a long-term, medium, adverse increment to this cumulative effect.

Conclusion

Alternative C would have a local, long-term, moderate, adverse effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and likely increased, number of vehicles on the Park Road throughout the season (moving or parked) and associated probable increase of off-bus human activity at transportation nodes. Alternative C would likely increase adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons due to increased traffic during those periods. The alternative would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as comprehensive monitoring programs and adaptive management measures (e.g., indicators and standards and BACI studies), a more protective management zone between Eielson and Wonder Lake, and reductions in private vehicle use.

ALTERNATIVE D

Analysis

Under alternative D, vehicle travel and off-bus visitor use along the Park Road would continue. This vehicle traffic and human activity would continue to have notable adverse effects on wildlife and wildlife habitat along the road corridor similar to the effects described in the analysis of alternative A.

Individual vehicles and/or queues of multiple vehicles (moving or parked) along the road would continue to adversely affect wildlife behavior, movement, and/or stress levels. Some individual animals would avoid the disturbance areas along the Park Road, while others would continue to become habituated to human presence. Other habitat degradation would continue from effects such as vegetation trampling and development of social trails in areas around transportation nodes.

However, alternative D would include a daily total vehicle cap of 160 vehicles (all motorized vehicles, including concessioner buses, NPS vehicles, and private vehicles). The transportation system on the Park Road would be managed to keep the maximum daily vehicle use below this cap during the entire visitation season.

Under alternative D (and as in alternative A), the impacts from off-bus activities would continue to be limited to areas around the developed transportation nodes along the road, per the 2006 *Backcountry Management Plan*.

The locations of these wildlife behavior and movement impacts from vehicle use and human activity along the Park Road would be different for the large mammal species. The potential for effects would be greatest for the following species in the following locations:

- **Dall sheep**: between Igloo Creek and Polychrome Overlook, which is the area of highest sheep concentration along the Park Road corridor
- **caribou**: between Polychrome Overlook and Wonder Lake, which is the area along the road corridor that typically has the highest caribou

concentration during the park visitation season

- **grizzly bear**: between Igloo Creek and Eielson, which is the area of highest bear concentration along the Park Road corridor
- **gray wolf**: between Savage River and Sanctuary River, at Igloo Creek, and between the Polychrome Overlook and Highway Pass, which are areas with fairly high wolf concentrations and den activity
- **moose**: along the eastern segments of the Park Road up to Sanctuary River, which is the largest area of the high moose concentration along the Park Road corridor; between Igloo Creek and Polychrome Overlook; and between Eielson and Wonder Lake

Although there would be similarities with alternative A, alternative D would involve multiple changes to the management of the transportation system on the Park Road (compared to alternative A). As a result, some of the effects on wildlife may be different from those under alternative A.

According to transportation models for alternative D, the total seasonal bus volume on the road could increase by 10.2% should the demand exist (assuming full schedules per day). Similarly, modeling suggests that the daily full schedule bus volume on the road could reach about 97 buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of as many as 100 buses under alternative A. However, for concession buses only, the average daily number of buses under alternative A is 77, compared to the average daily number that could be allowed under alternative D, which is 85.

These increases from current bus traffic levels under alternative D have the potential to increase the adverse effects on wildlife in some areas and during certain times of day. For example, both the estimated 10.2% increase in seasonal bus volume and the respective increases in average daily bus volumes could generate more overall noise and visual disturbances to wildlife along the corridor throughout the season. However, some of these potential increases in wildlife impacts would be mitigated or avoided by the use of adaptive management measures, which are discussed later in this "Analysis" section.

Alternative D may realize higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A). This potential shoulder season bus traffic increase could adversely affect the seasonal behavior of some wildlife species. For example, this anticipated increase in shoulder season traffic would occur during a period when Dall sheep typically cross the Park Road more frequently and vegetation "green up" has not yet occurred in the higher elevations along the road corridor. The springtime traffic increase could cause sheep to move away from the road and, thus, reduce their access to available foraging habitat (Phillips et al. 2010).

The transportation model for alternative D indicates this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wildlife during peak hours, the increased bus activity during mornings and evenings would increase disturbances to wildlife habitat in these shoulder periods. Therefore, this effect would extend the overall daily duration of notable levels of wildlife disturbance and reduce the amount of "downtime" for wildlife to be free from bus and human disturbances.

In addition, alternative D would include enhancements of premium tours that could involve more guided off-bus activities at

transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could disturb wildlife behavior and movement near the transportation nodes.

Also, under alternative D, professional photographers and commercial filming activity would continue to have adverse effects on wildlife and wildlife habitat along the road corridor. However, the photography and filming permit programs would merge under this alternative. Up to five permits would be made available for the entire Park Road as long as photography or filming vehicles do not displace buses or administrative traffic. Permits would not be issued during periods of known high traffic volumes and permits would include conditions that ensure that desired conditions for wildlife habitat are met. This permitting allowance is a decrease from alternative A, which would continue to allow up to five photo permits per day and additional separate filming permits. This alternative would reduce human disturbances to wildlife behavior and movement due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road.

Unlike alternative A, alternative D includes the creation of a new Wildlife Viewing Subzone 3 between Eielson Visitor Center and Wonder Lake. This new zone would be managed for the lowest traffic volume on the Park Road and would not allow notable volume/use growth beyond current conditions. As a result, disturbances to wildlife behavior and movement along the road corridor could be minimized more than alternative A due to lower traffic volumes and associated disturbances (e.g., noise, inhibited road crossing, off-bus human activities, and facilities development). Unlike alternative A, the new Wildlife Viewing Subzone 3 under alternative D would help ensure future limitations to road use and traffic volumes in this western segment of the Park Road.

The degree of beneficial effects from the new Wildlife Viewing Subzone 3 would vary for the large mammal species. This alternative would affect caribou and moose the most since this segment of the Park Road runs through high concentration areas for these species during the summer months. Effects on Dall sheep, grizzly bears, and gray wolves would be more limited because concentrations of these species are fairly low along the Park Road between Eielson and Wonder Lake.

Alternative D includes premium short tours that would primarily terminate and turn around at Teklanika. Thus, under this alternative, the Teklanika transportation hub would likely experience an increase in off-bus visitor activity, which could introduce higher levels of human activity and noise in an area that has a fairly high wolf concentration and den activity (between Teklanika and Igloo Creek), and a fairly high moose concentration.

Under alternative D, private vehicles that access the Teklanika River Campground would be required to travel westbound only during designated low traffic time periods, if necessary to meet management standards for desired conditions. Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this alternative would likely reduce overall peak traffic volumes. This could reduce disturbances to wildlife behavior and movement during the times of day when the highest levels of habitat disturbance occur in the area between the park entrance and Teklanika. Conversely, this action would also increase disturbances to wildlife behavior during the periods of low levels of habitat disturbance (i.e., off-peak hours). In addition to introducing adverse impacts on wildlife during off-peak periods, this alternative could lead to an increase in nighttime traffic.

The degree and locations of these wildlife impacts from changes in private vehicle use at and to the Teklanika River Campground would vary for the large mammal species.

The potential for effects would be greatest for the following species in the following locations:

- **gray wolf**: between Savage River and Sanctuary River, which is an area with fairly high wolf concentrations and den activity
- **moose**: along the eastern segments of the Park Road up to Sanctuary River
- **Dall sheep, caribou, and grizzly bear**: effects would be limited because concentrations of these species are relatively low along the Park Road east of Teklanika

Alternative D also includes several other measures that would benefit wildlife and wildlife habitat along the Park Road corridor.

First, vehicles and visitation would be managed to meet desired conditions of natural resources, such as wildlife, using indicators and standards and adaptive management actions.

The proposed indicators and standards that would affect wildlife and wildlife habitat conditions include

- sheep gap spacing,
- nighttime traffic levels, and
- number of vehicles at wildlife viewing stops.

These standards would help park staff determine if and when vehicle use conditions negatively affect wildlife movement and behavior.

For example, the use of the sheep gap spacing indicators and standards would help ensure that large mammals of the park would be given an adequate amount of time between vehicles to cross the Park Road in an uninhibited, undisturbed manner. The nighttime traffic level indicator and standard would help minimize disturbances to wildlife and wildlife habitat during off-peak hours, which would also help minimize negative effects on their behavior and movement the following morning. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also have beneficial effects on wildlife and wildlife habitat because it could help control and minimize the amount of human activity in the proximity of wildlife individuals along the road corridor.

The indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, one or more appropriate adaptive management actions would be triggered that would help avoid further adverse impact on wildlife and wildlife habitat (even if the total daily vehicle use is below the 160-vehicle cap).

In addition to the monitoring done for the indicator and standards, alternative D would include provisions for additional comprehensive monitoring of natural resource variables along the Park Road corridor. This additional monitoring would primarily involve ongoing wildlife population and distribution monitoring programs in the park. If adverse effects on wildlife populations, distributions, or behavior are observed via these comprehensive monitoring efforts (regardless of whether the total vehicle use is below the 160-vehicle cap), NPS staff would consider applying one or more management measures to mitigate these impacts.

Also, under alternative D, NPS staff would complete one BACI analysis to detect changes in other resource conditions a couple of years after this alternative is implemented. The "Before" monitoring component of the BACI analysis is already complete. To complete the overall analysis, the BACI study principles would be applied to monitoring the "After"

condition of various natural resource variables. Any resulting changes in resource conditions would be analyzed to discern cause-and-effect. The BACI study monitoring would include the following variables:

- distribution, number, and type of wildlife sightings along the road
- timing and location of Dall sheep and grizzly bear road crossings
- grizzly bear and Dall sheep movement rates across or near the Park Road
- distribution of bear inactive periods relative to the road
- probability and timing of Dall sheep road crossings

Like other forms of comprehensive monitoring of resources, the completion of one BACI analysis would help inform park staff of possible changes in wildlife habitat conditions that result from road use, which would initiate discussions on how to mitigate the impacts through various management measures.

Although alternative D is projected to involve a seasonal increase and average daily increases in total bus volumes on the Park Road (assuming a full schedule), comprehensive resource monitoring and adaptive management measures would be used to help prevent the potential adverse effects on wildlife. With these efforts in place, it is possible for the increases in vehicle volumes to occur while still limiting adverse effects on wildlife.

While the above-mentioned adaptive management and transportation system adjustments of this alternative would benefit grizzly bears and their habitat, some changes to the male and female distribution of grizzly bear activity along the Park Road corridor may also occur as a result of this alternative. As noted in chapter 3, bear monitoring evidence indicates that a higher level of female grizzly bear activity exists closer to and along the road corridor than male bear activity. Given this dichotomy, it is possible that female bears use the vehicle disturbances along the road as a buffer from the male bear threat to bear cubs. Therefore, if vehicle impacts on large mammal movement are reduced by the adaptive management and transportation system changes in alternative D, the possibility for an increase in male bear activity closer to the Park Road also exists. If this male bear distribution shift occurs, some changes could result in female distribution and/or cub mortality.

Under alternative D, NPS staff could continue to use private vehicles (and employee guests could travel with them). However, this vehicle use on the Park Road would only be allowed during low traffic volume periods. During high volume periods, NPS staff and guests would need to use the transit system. This adjustment of staff vehicle travel times would reduce road traffic during peak hours and reduce vehicle effects on wildlife behavior and movement (except during low traffic periods).

With the combined transit and self-guided tour bus system of alternative D functioning on a set schedule, some large mammals could habituate to the consistent patterns of bus traffic on road. This effect would be similar to the bus patterns that would continue under alternative A, and would be a benefit to wildlife behavior and movement.

Overall, despite the measures under alternative D that would help minimize impacts on wildlife, continued and increased vehicle use on the Park Road and associated human activity, including off-bus activities around transportation nodes, would have a long-term, moderate, adverse, and localized impact on wildlife and wildlife habitat along the Park Road corridor. These impacts would occur each year during the visitation season, and would include disturbances to wildlife feeding, mating, caring for young, and/or movement. The effects would result in some individual animals becoming more habituated to humans and changes to localized

populations of some species. The alternative would only have minimal effects on regional species populations. However, when compared to alternative A, this alternative would likely reduce adverse impacts on wildlife and wildlife habitat. This reduction would be due to actions such as improving habitat monitoring, using adaptive management measures, instituting a 160 daily total vehicle cap, and potentially modifying private vehicle use that would minimize road traffic during peak hours (e.g., park staff vehicles, photographers and filming crews, and visitors to the Teklanika River Campground). However, while the adaptive management measures would likely reduce wildlife impacts during daily peak hours and accommodate an increase in seasonal bus volumes, this alternative would likely increase adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons compared to alternative A.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had, and will have notable effects on the wildlife and wildlife habitat in the area. These projects and actions are described and summarized in the "Alternative A" section above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, and local to regionwide adverse impacts on wildlife and wildlife habitat in the park.

When the effects of alternative D actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wildlife and wildlife habitat. Alternative D would contribute a long-term, medium, adverse increment to this cumulative effect.

Conclusion

Alternative D would have a local, long-term, moderate, adverse effect on wildlife and wildlife habitat along the Park Road corridor. This effect would primarily result from the continued, and probably increased, number of vehicles (moving or parked) on the Park Road and associated increases in off-bus human activity at transportation nodes. This alternative would likely increase adverse effects on wildlife during the daily off-peak hours and during the shoulder seasons due to increased traffic during those periods. The alternative would have adverse impacts on wildlife behavior, movement, and stress levels. However, this alternative would also benefit wildlife and wildlife habitat from actions such as comprehensive monitoring programs and adaptive management measures (e.g., use of indicators and standards and a BACI study) and reductions in private vehicle use.

WILDERNESS

METHODOLOGY AND ASSUMPTIONS

The effects of implementing the various management alternatives on wilderness are analyzed in this section. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the context, intensity, duration, and type of potential impacts.

Measure

The 1964 Wilderness Act states "it is hereby declared to be the policy of Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness." One of the central mandates of this act is to preserve wilderness character. Section 2.(a) states that wilderness areas shall be administered "so as to provide for the protection of these areas, the preservation of their wilderness character . . .." Section 4.(b) states "Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character."

The Denali Park Road corridor is not designated wilderness land or wilderness-eligible land. However, since designated wilderness is in proximity (150 feet from the centerline on either side of the Park Road), activities that occur on and along the Park Road have the potential to affect the wilderness character of the lands that abut the corridor. Thus, this impact topic focuses on the extent to which the actions of the alternatives alter the wilderness character of the adjacent designated wilderness lands.

Wilderness character is not specifically defined in the 1964 Wilderness Act, nor is its meaning discussed in the act's legislative history. However, the Wilderness Act identifies the following qualities that unify wilderness areas regardless of their size, location, or any other feature.

Undeveloped – "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation . . .." This refers to areas that are essentially without permanent structures, enhancements, or modern human occupation. To retain its primitive character, a wilderness ideally is managed without the use of motorized equipment or mechanical transport.

Natural – "protected and managed so as to preserve its natural conditions . . .." This means areas that are largely free from the effects of modern civilization. It also refers to maintenance of natural ecological relationships and processes, continued existence of native wildlife and plants in largely natural conditions, and absence of distractions (e.g., large groups of people; mechanization; and evidence of human manipulation, unnatural noises, signs, and other modern artifacts).

Untrammeled – "an area where the earth and its community of life are untrammeled by man," and "generally appears to have been affected primarily by the forces of nature . . .." This refers to ecosystems that are unhindered and free from human control or manipulation. In other words, this wilderness quality can be degraded by human actions that control or manipulate components or processes of ecological systems within the wilderness area.

Outstanding Opportunities for Solitude or Unconfined Recreation – "has outstanding opportunities for solitude or a primitive and unconfined type of recreation . . .." Solitude means encountering few, if any, people and experiencing privacy and isolation. Primitive and unconfined recreation refers to freedom to explore with few restrictions, and the ability to be spontaneous. It means self-sufficiency without support facilities or motorized transportation, and experiencing weather, terrain, and other aspects of the natural world with minimal shelter or assistance from devices of modern civilization.

Intensity Definitions

Minor. Effects on opportunities for solitude or a primitive and unconfined wilderness experience would be only slightly beneficial or adverse. Changes due to visible development, use of motorized vehicles, or other factors that alter the undeveloped, natural, and untrammeled qualities of wilderness would affect an isolated portion of the wilderness area (or a wilderness-eligible area). Natural conditions would predominate.

Moderate. Some notable effects on opportunities for solitude or a primitive and unconfined wilderness experience would occur. Changes due to visible development, use of motorized vehicles, or other factors that alter the undeveloped, natural, and untrammeled qualities of wilderness would be evident and would affect one or more portions of the wilderness area (or wilderness-eligible areas). Natural conditions would predominate overall, but some changes to wilderness character would occur.

Major. Effects on opportunities for solitude or a primitive and unconfined wilderness experience would be substantial. Changes due to visible development, use of motorized vehicles, or other factors that alter the undeveloped, natural, and untrammeled qualities of wilderness would be extensive and would affect multiple portions of the wilderness area (or wilderness-eligible areas). Natural conditions would be affected in some wilderness areas, and large changes to wilderness character would occur.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Analysis

Under alternative A, the transportation system on the Park Road would continue to be managed to maintain the previously set 10,512 vehicles per year maximum and to provide the current offerings of tours and off-bus activities. This continued operation would maintain the average of 83 total buses per day throughout the visitation season (concessioner and lodge buses). The system volume on the Park Road could be expected to peak at about 91 total buses per day during mid-summer months, but would only reach about 71 total buses per day through the first week of June during the spring shoulder season.

Under alternative A, the highest level of bus traffic would continue to occur during the peak hours of the day (late morning through mid-afternoon), with notably lower traffic volumes in the shoulder periods of the day (early to mid-morning and late afternoon through evening).

The implementation of alternative A would continue to have a variety of effects on the wilderness character along the Park Road corridor. Adverse effects would continue to result from individual vehicles, queues of multiple vehicles, off-bus human activity at transportation hubs along the full length of the road, and continued road and facility maintenance.

The four qualities of wilderness character would continue to be affected by the implementation of alternative A in the following ways.

Undeveloped. Under alternative A, the existing road, the bus traffic on it, the existing park facilities at transportation nodes, and the maintenance activities of these features would continue to be human imprints on the landscape, as seen and heard from the wilderness lands along the road corridor. Given the wide-open viewsheds and high sound propagation of the wilderness landscape along the Park Road corridor, the structures, road vehicles, activities, and noises would continue to be observed and heard from wilderness lands in the area. Vegetation trampling and social trails in high use areas would also be noticeable. All of these "imprints of man's work" and signs of human presence would be most noticeable in wilderness areas surrounding the transportation nodes and areas where the Park Road is directly in view. However, at times of heavy traffic volumes and/or road maintenance activities, the imprints would also continue to be very noticeable in several areas along the corridor.

The professional photography permit program would continue to allow five road permits per day for private photography vehicles via a lottery system. The park's commercial filming program would also grant a discretionary number of special use permits (independent of photography permitting). In addition to the Park Road's overall traffic volume, the private vehicles associated with photography and filming would be parked along the Park Road corridor for lengthy periods of time. This level of photography and filming use would continue to be signs of human presence and evidence of developed conditions along the corridor.

Alternative A would also maintain the current management zones as defined by the 1997 *Entrance Area and Road Corridor Development Concept Plan*. These management zones could allow some increases in vehicle use and transportation system development between Eielson and Wonder Lake — currently a less-developed segment of the road corridor. Future changes in allowable traffic volumes and associated human activity along this segment could have adverse effects on the undeveloped condition of wilderness by introducing more noise, human presence, and vehicles in the viewshed.

Natural. Under alternative A, the Park Road infrastructure, vehicle traffic, and human activity around transportation nodes would continue to alter the natural conditions along the corridor, such as natural processes and ecological systems (e.g., wildlife movement and vegetation patterns). Natural processes and conditions such as water quality, surface hydrology regime, and soil horizons and soil erosion would all continue to be affected by the road, vehicle traffic, and human use in the corridor (e.g., at transportation nodes). Other ecological attributes such as vegetation community patterns and wildlife movement/behavior would also continue to be adversely affected by these developments, uses, and noises. Given the interconnectedness of the park's natural ecology, these continuing human-introduced conditions along the Park Road would also continue to degrade the natural conditions of the surrounding wilderness lands. The adverse impact on wildlife habitat is described in the "Wildlife Habitat" section above.

As noted in the section above, alternative A would also maintain the current management zones as defined by the 1997 *Entrance Area and Road Corridor Development Concept Plan*. Future changes in allowable traffic volumes and associated human activity along this segment could have adverse effects on the natural condition of wilderness by introducing more noise and human presence to the natural system. These disturbances could further alter the natural ecology and processes of the area wilderness lands.

Untrammeled. The continued implementation of alternative A and the associated management of the natural landscape along the road corridor and at transportation nodes would continue to alter the untrammeled quality of some wilderness

that is immediately adjacent to the corridor. For example, the control of surface hydrology along the road would also affect downstream hydrology on wilderness lands. Also, the management of vegetation along trails and human access points near transportation nodes would continue to impact the "forces of nature" effects on the immediately adjacent wilderness lands. However, since active management of the Park Road, bus system, and transportation node areas do not occur on wilderness lands, other effects of this management would not be considered "trammeling" of wilderness.

Outstanding Opportunities for Solitude or Unconfined Recreation. Alternative A would continue to have effects on opportunities for solitude and unconfined recreation on wilderness lands along the Park Road corridor. The existing transportation system would continue to bring human presence, activities, noise, and other reminders of society very near backcountry areas of the park. Park visitors would continue to use the transit buses to access backcountry areas. Thus, some higher concentrations of backcountry visitors would continue to be expected at transportation nodes along the road and in wilderness areas that radiate from the transportation nodes. This distribution of backcountry visitors would continue to have adverse effects on opportunities for solitude in some areas, particularly near the transportation nodes. Off-bus tour activity around transportation nodes such as day hiking would also continue to compound the disturbances to solitude near and in wilderness areas. In addition, the sense of solitude in wilderness for backcountry users would continue to be adversely affected by the visual intrusion and noises of buses, private vehicles, and NPS maintenance operations along the extent of the Park Road.

Under alternative A, the impacts from off-bus tour activities would continue to be limited to areas around the developed transportation nodes along the road, per the 2006 *Backcountry Management Plan*.

The continued implementation of the park's photography/filming policies and existing management zones (mentioned above) could also continue to result in adverse effects on the sense of solitude for backcountry users.

Also noted in the sections above, alternative A would maintain the current management zones as defined by the 1997 *Entrance Area and Road Corridor Development Concept Plan*. Future changes in allowable traffic volumes and associated human activity along this segment could degrade opportunities for solitude in wilderness by introducing more noise and human presence to the natural system.

To help assess visitor experience and the four qualities of wilderness character, park staff would continue to conduct random, informal visitor surveys and resource monitoring under alternative A. However, these efforts would not be part of a formalized, quantified adaptive management program. The actual act of conducting surveys near wilderness access points could impact the sense of unconfined recreation for wilderness users.

Collectively, with the continuation of the above effects on the four qualities of wilderness character, alternative A would result in a local, long-term, moderate, adverse effect on wilderness character. All four wilderness qualities of the surrounding wilderness lands along the Park Road corridor would continue to be adversely affected (i.e., opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of wilderness). These adverse effects would primarily relate to the continued visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the Park Road, and from the continued concentrated human activity and imprints at the park's transportation nodes and along the road itself.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor and throughout the park have had, and would continue to have, notable effects on the wilderness character in the area.

Past and current NPS plans established permit systems for wilderness use and adaptive management standards for wilderness experience. For example, the 2006 *Backcountry Management Plan* established standards for visitor experience indicators such as the number of encounters with other parties and the number of encounters with large groups. Managing for these standards help protect opportunities for solitude in wilderness and help limit impacts on vegetation and wildlife habitat on wilderness lands (by limiting overcrowding in wilderness areas). Standards for camping density assure that backcountry visitors would have the opportunity to camp out of sight and sound of other visitors. Standards for the number of encounters with evidence of modern human use ensure that in most of the backcountry, visitors would continue to encounter few or no signs of modern equipment. As park visitation to the park increases, these standards protect wilderness character and experience by triggering management actions to disperse or limit the density of visitors in locations where problems arise.

The use of backcountry unit quotas (via a permitting system), as established by the 1976 *Backcountry Management Plan*, protects wilderness experience in the backcountry of the Old Park by limiting encounters, dispersing visitors and visitor impacts, and ensuring that the majority of visitors could camp out of sight and sound of others. The permit requirement for the Old Park lands restricts freedom of movement since visitors must camp in the unit for which they have a permit on any given night. However, day users are not similarly restricted.

Scenic air tours also have considerable impact on wilderness in the park. The increase in scenic air tours through the park has resulted in more noise disturbances in wilderness areas. The loud motorized noises generated by these planes further spread signs of modern human uses and disturb natural soundscapes over large geographic areas of wilderness in the park. Overall, given the noise volumes and large areas of sound propagation, noise disturbances from motorized use in the air have substantial adverse effects on wilderness values in the park.

The 2006 *Backcountry Management Plan* established management areas in the park that allow varying levels of natural sound disturbances. Approximately 80% of the park and preserve is within a management zone that allows low levels of natural sound disturbance. Approximately 9% is zoned to allow medium levels of natural sound disturbance, and another 9% is zoned to allow a high level of disturbance. These limits for noise disturbances have beneficial effects on wilderness values in the Old Park, but adverse effects on wilderness in some other areas that are suitable for wilderness designation.

Various past and present NPS plans have directed the development of recreation facilities near or in designated wilderness lands. These developments have adverse effects on wilderness values by bringing more imprints of human development and increased human presence and noises close to wilderness areas. For example, the park's 2006 *Backcountry Management Plan* guided the development of some new official trails and other recreation facilities in areas immediately adjacent to wilderness lands, including locations such as the Triple Lakes, Savage, Wonder Lake, and the Eielson Visitor Center areas. In addition, the 1997 *Entrance Area and Road Corridor Development Concept Plan* guided the Park Service to construct trails that extend into the designated wilderness of the Old Park, and is guiding the development of additional trails. These trails are permanent new structures in the wilderness area, despite

being a short distance relative to the overall wilderness area size.

In past years, the Park Service has established seasonal administrative camps in wilderness at the Kahiltna Base Camp and at the 14,000-foot level on Mount McKinley, and has generally increased research and administrative activity in the backcountry. These increases in NPS activities include the use of aircraft and other motorized equipment and some temporary and long-term installations of communications and research equipment. This heightened administrative presence and noises, and the resulting adverse impacts on wilderness values, are observable to backcountry visitors, particularly in the vicinity of the administrative camps or repeater sites.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wilderness in the park. Notably, there has been a substantial increase in airplane use over a large portion of the park wilderness areas, and a gradual increase in communication sites and temporary and permanent research installations in wilderness.

When the effects of alternative A actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative A would contribute a substantial, long-term, adverse increment to this cumulative impact.

Conclusion

Alternative A would result in a local, long-term, moderate, adverse effect on opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the Park Road, and from the continued concentrated human activity and imprints at and around the park's transportation nodes and road.

ALTERNATIVE B

Analysis

Under alternative B, the Park Road would continue to be used for park visitation and wilderness access, resulting in continuing road maintenance, vehicle traffic, and off-bus human activity at transportation nodes along the full length of the road. This vehicle traffic and human activity would continue to have notable adverse effects on wilderness character along the road corridor similar to the effects described in alternative A. In addition to these continuing effects of vehicle and human traffic on the Park Road, some changes to wilderness impacts could be expected.

According to transportation models for alternative B, the total seasonal bus volume on the road could increase by 10.2% should the demand exist (assuming full schedules per day). Similarly, modeling suggests that the daily full schedule bus volume on the road could reach about 97 total buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of 100 buses under alternative A. The alternative B full schedule bus volume (97 buses per day) would also be notably higher than the full season daily average of 83 buses per day under alternative A. Alternative B would also allow higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A).

These increases from current vehicle traffic levels under alternative B have the potential to increase the adverse effects on wilderness character during certain periods of day and

season. For example, both the estimated 10.2% increase in seasonal bus volume and the respective increases in daily volumes could generate more overall noise and visual disturbances to wilderness along the corridor throughout the visitation season.

More specifically, alternative B would affect the four qualities of wilderness character in the following ways.

Undeveloped. Under alternative B, the effects on the undeveloped quality of the adjacent wilderness lands would be similar to those described under alternative A in many regards. However, the anticipated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the undeveloped quality of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make "imprints of man's work" more evident at or near the interface with the wilderness lands, and thus increase the adverse effect on the undeveloped quality of the wilderness.

In addition, the transportation model for alternative B indicates this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wilderness values during peak hours, the increased bus noises and visual disturbances during mornings and evenings would increase adverse effects on the undeveloped quality of wilderness lands during these shoulder periods. Alternative B also would allow the potential for shoulder season traffic increases (e.g., through the first week of June), which would adversely affect the undeveloped quality of wilderness character during these periods.

Under alternative B, activity and traffic associated with professional photographers and commercial filming would continue to have adverse effects on wilderness character along the road corridor (e.g., from human disturbances and parked vehicles). However, the photography and filming permit programs would merge under this alternative. A maximum of two permits per day would be issued. This permitting allowance is a decrease from alternative A. This change would result in a reduction of impacts on the undeveloped quality of wilderness from these uses due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road. For example, decreased impacts on natural viewshed as seen from wilderness lands could be expected.

Alternative B also includes provisions for separating the premium bus tours into short and long tours. While the long tours would continue to transportation nodes much farther west along the road corridor, the short tours would primarily terminate and turn around at Teklanika. Thus, under this alternative, the Teklanika transportation hub would likely experience an increase in off-bus visitor activity, which could introduce higher levels of human presence and noises close to undeveloped wilderness.

Alternative B would include enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could alter undeveloped wilderness qualities in areas around the transportation nodes.

As with alternative A, alternative B would maintain the current road corridor management zones (per the 1997 *Entrance Area and Road Corridor Development Concept Plan*). These management zones could allow future increases in vehicle use and human presence, and respective impacts on

wilderness, between Eielson and Wonder Lake (as described under alternative A).

Under alternative B, private vehicles that access the Teklanika River Campground would be required to travel westbound only during designated low traffic time periods. Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this action would likely reduce overall peak traffic volumes. This would reduce the visual intrusions and noises caused by peak traffic volumes, and thus could reduce adverse effects on the undeveloped quality of immediately adjacent wilderness lands. Conversely, this action would also increase disturbances to wilderness during the periods of low levels of noise and visual disturbances (i.e., off-peak hours). In addition to introducing more adverse impacts during off-peak periods, this alternative could lead to an increase in nighttime traffic. Thus, the adaptive management efforts to control nighttime traffic levels may also be affected by this alternative at Teklanika River Campground.

Under alternative B, the Teklanika River Campground would phase into a tents-only camping area within 10 years of plan implementation. When this occurs, visitors would be required to use the transportation system for campground access, which would reduce the number of private vehicles on the road and would reduce traffic volumes. This traffic and private vehicle reduction would minimize impacts on undeveloped qualities of wilderness along the Park Road east of Teklanika. In addition, the elimination of motorized uses in the campground (e.g., idling engines and generators) would reduce noises and other human-caused disturbances to undeveloped wilderness areas.

Under alternative B, NPS staff and their guests would be required to use an employee shuttle system for all personal travel along the Park Road. This action would reduce the overall number of private vehicles on the Park Road and would reduce vehicle volumes during peak traffic periods. In turn, this effect would minimize vehicle effects on wilderness character.

Also, under alternative B, vehicles and visitation would be managed in a way that would help meet the desired conditions of undeveloped wilderness quality through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, although the indicator and standard for vehicles at wildlife viewing stops would be intended primarily to minimize crowding for park visitors along the road, it could also benefit the undeveloped wilderness quality because it could help control and minimize the amount of human activity and unnatural conditions (e.g., vehicles) in the viewshed as seen and heard from the adjacent wilderness areas.

The preservation of these natural and human values directly supports wilderness character. Under alternative B, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impact on wilderness character along the Park Road corridor.

Natural. Under alternative B, the effects on the natural quality of the adjacent wilderness lands would be similar to those described under alternative A. However, the estimated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the natural conditions and ecology of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would

generate more overall noise and visual disturbances, which could disturb wildlife behavior and movement (as described in the "Wildlife Habitat" section).

The natural quality and ecology of adjacent wilderness lands would also be affected by other actions and implementing alternative B. Many of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative B include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening;
- reduction in activity and traffic involving professional photographers and commercial filming;
- separation of the premium bus tours into short and long tours, with the short tours terminating at Teklanika (generating an increase in off-bus human activity);
- enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor;
- continuation of the current road corridor management zones (per the 1997 *Entrance Area and Road Corridor Development Concept Plan*), which could allow future increased traffic/activity between Eielson and Wonder Lake;
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods;
- phasing of the Teklanika River Campground into a tents-only camping area within 10 years of plan implementation; and
- requirement for NPS staff and their guests to use an employee shuttle system for all personal travel along the Park Road.

All of the above bulleted components of alternative B would affect the natural quality and ecology of the wilderness lands adjacent to the road corridor. The resulting increases or decreases in vehicle traffic or off-bus human activity that result from these components of alternative B would primarily affect wildlife behavior and movement (due to increases or decreases in disturbances from human activity or noise). These effects are noted in more detail in the "Wildlife Habitat" section above.

Also, under alternative B, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. For example, the proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting the natural quality and ecology of wilderness areas along the road corridor.

The use of the sheep gap spacing indicator and standard would help ensure that large mammals of the park would be given an adequate amount of time between passing vehicles to cross the Park Road in an unobstructed, undisturbed manner, and thus maintain a more natural ecological system. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also benefit the natural quality of wilderness

character by helping to control and minimize the amount of human activity that could disturb nearby wildlife.

The preservation of all of these natural and human values directly support wilderness character. Under alternative B, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impacts on wilderness character along the Park Road corridor.

In addition to the monitoring done for the indicator and standards, alternative B would include provisions for additional monitoring of natural resource variables. Under alternative B, the park staff would use the BACI study design to detect changes in other resource conditions, as discussed in the section on impacts on wildlife.

Given the inherent connections between wilderness values and natural systems, the BACI study monitoring would help park staff assess wilderness value conditions to make sure that natural processes and ecological connections are maintained. The BACI study monitoring results would be used to help park staff make transportation management decisions that would minimize impacts on wildlife and their contribution to the natural quality of wilderness character.

Untrammeled. The implementation of alternative B and the associated management of the natural landscape along the road corridor and at transportation nodes would alter the untrammeled quality of some wilderness that is immediately adjacent to the corridor. The effects would be similar to those described under alternative A.

Outstanding Opportunities for Solitude or Unconfined Recreation. Under alternative B, the effects on opportunities for solitude or unconfined recreation on adjacent wilderness lands would be similar to those described under alternative A. However, the anticipated overall increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the opportunities for solitude quality of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make nearby human presence more evident to wilderness users. In addition, the estimated increase in off-bus activity at or radiating from transportation nodes would diminish feelings of primitive isolation, privacy, and solitude. These increases in human and bus traffic would have adverse effects on the opportunities for solitude quality of the wilderness character.

Opportunities for solitude would also be affected by other actions and from implementing alternative B. Many of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative B include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening
- reduction in activity and traffic involving professional photographers and commercial filming
- separation of the premium bus tours into short and long tours, with the short tours terminating at Teklanika (generating an increase in off-bus human activity at Teklanika)
- enhancements on premium tours that could involve more guided off-bus

activities at transportation nodes along the full length of the corridor
- continuation of the current road corridor management zones (per the 1997 *Entrance Area and Road Corridor Development Concept Plan*), which could allow future increased traffic and off-bus human activity between Eielson and Wonder Lake
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods
- phasing of the Teklanika River Campground into a tents-only camping area within 10 years of plan implementation
- requirement for NPS staff and their guests to use an employee shuttle system for all personal travel along the Park Road

All of the above bulleted components of alternative B would affect the opportunities for solitude or unconfined recreation on adjacent wilderness lands. The anticipated increases or decreases in bus volume or off-bus human activity that result from these components of alternative B would primarily lead to increases or decreases in disturbances and human encounters for those seeking solitude, isolation, and privacy in wilderness.

Also, under alternative B, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, the nighttime traffic level indicator and standard would help minimize impacts on wilderness character by controlling road disturbances during times when expectations for solitude and natural quiet are highest for the visitor.

Under alternative B, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to adjust or reduce adverse impacts to avoid further adverse impacts on wilderness character along the Park Road corridor.

Overall, due to the above effects on the four qualities of wilderness character, alternative B would have a local, long-term, moderate, adverse effect on wilderness character. All four wilderness qualities of the surrounding wilderness lands along the Park Road corridor would be adversely affected in some way (e.g., opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of wilderness). These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and undeveloped, natural, and untrammeled wilderness conditions due to possible increases in bus traffic and increased off-bus activity at transportation nodes. However, alternative B would also provide some benefits to wilderness character, such as improving habitat monitoring and protection along the road via the use of adaptive management measures such as indicators and standards, the BACI study, and some reductions in private vehicle use that would help minimize traffic noise and visual disturbances.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had, and will have notable effects on wilderness values in the area. These projects and actions are described and summarized in the "Alternative A" section on wilderness above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wilderness in the park.

When the effects of alternative B actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative B would contribute a substantial, long-term, adverse increment to this cumulative effect on wilderness.

Conclusion

Alternative B would result in a local, long-term, moderate, adverse effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative B would also improve the preservation of wilderness character relative to alternative A from actions such as adaptive management measures and some reductions in private vehicle use.

ALTERNATIVE C

Analysis

Alternative C would involve multiple changes to the management of the transportation system on the Park Road (compared to alternative A). According to transportation models for alternative C, should the demand exist, the total seasonal bus volume on the road could increase by 8.7% (assuming full schedules per day). The daily full schedule bus volume on the road could reach about 95 total buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of 100 buses under alternative A. However, the alternative C full schedule bus volume (89 buses per day) would be higher than the full season daily average of 83 total buses per day under alternative A. Alternative C would also allow higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A).

Alternative C would involve multiple changes to the management of the transportation system on the Park Road (relative to alternative A). According to transportation models for alternative C, should the demand exist, the total seasonal bus volume on the road could increase by 8.7% (assuming full schedules per day). The daily full schedule bus volume on the road could reach about 95 total buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of 100 buses under alternative A. However, the alternative C full schedule bus volume (89 buses per day) would be higher than the full season daily average of 83 total buses per day under alternative A. Alternative C would also allow higher daily bus volumes on the road through the first week of June (compared to an average of 71 total buses realized per day under alternative A).

These increases in vehicle traffic levels under alternative C have the potential to increase the adverse effects on wilderness character during certain periods of day and season. For

example, the estimated 8.7% increase in seasonal bus volume and the respective increases in average daily volumes could generate more overall noise and visual disturbances to wilderness along the corridor throughout the season.

More specifically, alternative C would affect the four qualities of wilderness character in the following ways.

Undeveloped. Under alternative C, the effects on the undeveloped quality of the adjacent wilderness lands would be similar to those described under alternative A. However, the anticipated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the undeveloped quality of adjacent wilderness lands. For example, the estimated 8.7% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make "imprints of man's work" more evident at or near the interface with the wilderness lands, and thus increase the adverse effect on the undeveloped quality of the wilderness.

In addition, the transportation model for alternative C indicates that this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wilderness values during peak hours, the increased bus noises and visual disturbances during mornings and evenings would increase adverse effects on the undeveloped quality of wilderness lands during these shoulder periods. Alternative C also would allow the potential for shoulder season traffic increases (e.g., through the first week of June), which would adversely affect the undeveloped quality of wilderness character during these periods.

Under alternative C, activity and traffic associated with professional photographers and commercial filming would continue to have adverse effects on wilderness along the road corridor. The photography and filming permit programs would merge under this alternative and up to three permits would be made available for the Park Road on any one day. This permit availability is a decrease from alternative A, which would continue to allow five photography permits per day and additional separate filming permits. This change would result in a reduction of impacts on the undeveloped quality of wilderness from these uses due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road. For example, decreased impacts on natural viewsheds as seen from wilderness lands could be expected.

Alternative C would include enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could alter undeveloped wilderness qualities in areas around the transportation nodes.

Under alternative C, a new Wildlife Viewing Subzone 3 would be added, between Eielson Visitor Center and Wonder Lake. This new zone would be managed for the lowest traffic volume on the Park Road and notable volume/use growth beyond current conditions would not be allowed. The undeveloped quality of wilderness character in this segment would be preserved more than under alternative A because this new zone would help ensure low future traffic volumes in this area. Natural sounds, a wild and remote experience, a contemplative setting, and natural viewsheds (i.e., without traffic in view) would be better preserved in the long term under this alternative.

Under alternative C, private vehicles that access the Teklanika River Campground would be required to travel westbound only

during designated low traffic time periods. Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this action would likely reduce overall peak traffic volumes. This would reduce the visual intrusions and noises caused by peak traffic volumes, and thus could reduce adverse effects on the undeveloped quality of immediately adjacent wilderness lands. Conversely, this action would also increase disturbances to wilderness during the periods of low levels of noise and visual disturbances (i.e., off-peak hours). In addition to introducing more adverse impacts during off-peak periods, this action could lead to an increase in nighttime traffic. Thus, the adaptive management efforts to control nighttime traffic levels may also be affected by this action at Teklanika River Campground.

Due to the expanded ability of the transit system to pick up hikers under alternative C, visitors would have more confidence in that service and, therefore, have more freedom to change their travel plans and destinations by getting off and reboarding transit buses along the length of the Park Road. If visitors take advantage of this increased independence and flexibility, an increase in off-bus, unguided, human activity could be expected at or around many transportation nodes along the full length of the road. If this occurs, an increase in dispersed human activity and associated impacts on wilderness qualities could occur (e.g., increases in noises and activity around transportation nodes).

Under alternative C, NPS staff and their guests could continue to use private vehicles on the Park Road. However, this vehicle use would only be allowed during low traffic volume periods. During high volume periods on the Park Road, NPS staff and guests would need to use the transit system. As with the changes to Teklanika River Campground access and professional photographer access, this adjustment of staff vehicle travel times and vehicle use would reduce road traffic during peak hours and reduce vehicle effects on the undeveloped quality of wilderness. However, this action would also increase disturbances to wilderness character during the periods of low levels of noise and visual disturbances (i.e., off-peak hours). In addition to introducing more adverse impacts during off-peak periods, this action could lead to an increase in nighttime traffic.

Under alternative C, vehicles and visitation would be managed in a way that would help meet the desired conditions of undeveloped wilderness quality through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also benefit the undeveloped wilderness quality because it could help control and minimize the amount of human activity and unnatural conditions (e.g., vehicles) in the viewshed, as seen and heard from the adjacent wilderness areas.

The preservation of these natural and human values directly supports wilderness character. Under alternative C, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to adjust or reduce adverse impacts to avoid further adverse impact on wilderness character along the Park Road corridor.

Natural. Under alternative C, the effects on the natural quality of the adjacent wilderness lands would be similar to those described under alternative A. However, the estimated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would

increase the degree of the disturbances to the natural conditions and ecology of adjacent wilderness lands. For example, the estimated 8.7% increase in seasonal bus volume would generate more overall noise and visual disturbances, which could disturb wildlife behavior and movement (as described in the "Wildlife Habitat" section).

The natural quality and ecology of adjacent wilderness lands would also be affected by other actions and from implementing alternative C. Most of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative C include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening
- reduction in activity and traffic involving professional photographers and commercial filming
- enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor
- creation of a new Wildlife Viewing Subzone 3, between Eielson Visitor Center and Wonder Lake, that would be managed for the lowest traffic volume
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods
- expanded ability of the transit system to pick up hikers, resulting in increased independence and flexibility, and an increase in off-bus, unguided, human activity at or around many transportation nodes
- requirement that NPS staff and their guests only use private vehicles on the Park Road during low traffic volume periods (thus, reduced vehicle volumes during daytime peaks and increased vehicle volumes in off-peak periods)

All of the above bulleted components of alternative C would affect the natural quality and ecology of the wilderness lands adjacent to the road corridor. The resulting increases or decreases in vehicle traffic or off-bus human activity that result from these components of alternative C would primarily affect wildlife behavior and movement (due to increases or decreases in disturbances from human activity or noise). These effects are noted in more detail in the "Wildlife Habitat" section above.

Under alternative C, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. For example, the proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting the natural quality and ecology of wilderness areas along the road corridor.

The use of the sheep gap spacing indicator and standard would help ensure that large mammals of the park would be given an adequate amount of time between passing vehicles to cross the Park Road in an unobstructed, undisturbed manner, and thus maintain a more natural ecological system. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also

benefit the natural quality of wilderness character by helping to control and minimize the amount of human activity that could disturb nearby wildlife.

The preservation of all of these natural and human values directly supports wilderness character. Under alternative C, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to adjust or reduce adverse impacts to avoid further adverse impacts on wilderness character along the Park Road corridor.

In addition to the monitoring done for the indicator and standards, alternative C would include provisions for additional monitoring of natural resource variables. Under alternative C, the park staff would use the BACI study design to detect changes in other resource conditions, as discussed in the section on impacts on wildlife.

Given the inherent connections between wilderness values and natural systems, the BACI study monitoring would help park staff assess wilderness value conditions to make sure that natural processes and ecological connections are maintained. The BACI study monitoring results would be used to help park staff make transportation management decisions that would minimize impacts on wildlife and their contribution to the natural quality of wilderness character.

Untrammeled. The implementation of alternative C and the associated management of the natural landscape along the road corridor and at transportation nodes would alter the untrammeled quality of some wilderness that is immediately adjacent to the corridor. The effects would be similar to those described under alternative A.

Outstanding Opportunities for Solitude or Unconfined Recreation. Under alternative C, the effects on opportunities for solitude or unconfined recreation on adjacent wilderness lands would be similar to those described under alternative A. However, the anticipated overall increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the opportunities for solitude quality of adjacent wilderness lands. For example, the estimated 9.3% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make nearby human presence more evident to wilderness users. In addition, the estimated increase in off-bus activity at or radiating from transportation nodes would diminish feelings of primitive isolation, privacy, and solitude. These increases in human and bus traffic would have adverse effects on the opportunities for solitude quality of the wilderness character.

Opportunities for solitude would also be affected by other actions and from implementing alternative C. Many of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative C include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening
- reduction in activity and traffic involving professional photographers and commercial filming
- enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor

- creation of a new Wildlife Viewing Subzone 3, between Eielson Visitor Center and Wonder Lake, that would be managed for the lowest traffic volume
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods
- expanded ability of the transit system to pick up hikers, resulting in increased independence and flexibility and an increase in off-bus, unguided, human activity at or around many transportation nodes
- requirement that NPS staff and their guests only use private vehicles on the Park Road during low traffic volume periods (thus, reduced vehicle volumes during daytime peaks and increased vehicle volumes in off-peak periods)

All of the above bulleted components of alternative C would affect the opportunities for solitude or unconfined recreation on adjacent wilderness lands. The anticipated increases or decreases in bus volume or off-bus human activity that result from these components of alternative C would primarily lead to increases or decreases in disturbances and human encounters for those seeking solitude, isolation, and privacy in wilderness.

Under alternative C, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, the nighttime traffic level indicator and standard would help minimize impacts on wilderness character by controlling road disturbances during times when expectations for solitude and natural quiet are highest for the visitor.

Under alternative C, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impacts on wilderness character along the Park Road corridor.

Overall, due to the above effects on the four qualities of wilderness character, alternative C would have a local, long-term, moderate, adverse effect on wilderness character. All four wilderness qualities of the surrounding wilderness lands along the Park Road corridor would be adversely affected (e.g., opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of wilderness). These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to opportunities for solitude and undeveloped, natural, and untrammeled wilderness conditions due to possible increases in bus traffic and increased off-bus activity at transportation nodes. However, alternative C would also provide some benefits to wilderness character, such as improving habitat monitoring and protection along the road via the use of adaptive management measures such as indicators and standards, the BACI study, the establishment of a more protective management zone between Eielson and Wonder Lake, and reductions in private vehicle use that would help minimize traffic noise and visual disturbances.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had and will have notable effects on wilderness lands in the area. These projects and actions are described and summarized in the "Alternative A" section on wilderness above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wilderness in the park.

When the effects of alternative C actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative C would contribute a substantial long-term, adverse increment to this cumulative effect on wilderness.

Conclusion

Alternative C would result in a long-term, moderate, adverse, and local effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative C would also improve the preservation of wilderness character relative to alternative A due to actions such as adaptive management measures, the establishment of a more protective management zone between Eielson and Wonder Lake, and reductions in private vehicle use.

ALTERNATIVE D

Analysis

Under alternative D, the Park Road would continue to be used for park visitation and wilderness access, resulting in continuing road maintenance, vehicle traffic, and off-bus human activity at transportation nodes along the length of the road. This vehicle traffic and human activity would continue to have a variety of notable adverse effects on wilderness character along the road corridor similar to the effects described in the alternative A analysis above. In addition to these continuing effects of vehicle and human traffic on the Park Road, some changes to wilderness impacts could be expected.

According to transportation models for alternative D, the total seasonal bus volume on the road could increase by 10.2% should the demand exist (assuming full schedules per day). Similarly, modeling suggests that the daily full schedule bus volume on the road could reach about 97 total buses per day (concessioner and lodge buses), which is comparable to the summer peak day volume of 100 buses under alternative A.

However, alternative D would include a daily total vehicle cap of 160 vehicles (all motorized vehicles, including concessioner buses, NPS vehicles, and private vehicles). The transportation system on the Park Road would be managed to keep the maximum daily vehicle use below this cap during the entire visitation season.

The alternative D full schedule bus volume (97 buses per day) would also be notably higher than the full season daily average of 83 total buses per day under alternative A. Alternative D would also allow higher daily bus volumes on the road through the first week of June

(compared to an average of 71 total buses realized per day under alternative A).

These increases from current vehicle traffic levels under alternative D have the potential to increase the adverse effects on wilderness character during certain periods of day and season. For example, both the estimated 10.2% increase in seasonal bus volume and the respective increases in daily volumes could generate more overall noise and visual disturbances to wilderness along the corridor throughout the visitation season.

More specifically, alternative D would affect the four qualities of wilderness character in the following ways.

Undeveloped. Under alternative D, the effects on the undeveloped quality of the adjacent wilderness lands would be similar to those described under alternative A in many ways. However, the anticipated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the undeveloped quality of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make "imprints of man's work" more evident at or near the interface with the wilderness lands, and thus increase the adverse effect on the undeveloped quality of the wilderness.

In addition, the transportation model for alternative D indicates that this alternative would reduce bus volumes on the road during the peak daytime hours and distribute the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening. Although this traffic distribution would benefit wilderness values during peak hours, the increased bus noises and visual disturbances during mornings and evenings would increase adverse effects on the undeveloped quality of wilderness lands during these shoulder periods. Alternative D also would allow the potential for shoulder season traffic increases (e.g., through the first week of June), which would adversely affect the undeveloped quality of wilderness character during these periods.

Under alternative D, activity and traffic associated with professional photographers and commercial filming would continue to have adverse effects on wilderness character along the road corridor (e.g., from human disturbances and parked vehicles). However, the photography and filming permit programs would merge under this alternative. Up to five permits would be made available for the entire Park Road as long as photography or filming vehicles do not displace buses or administrative traffic. Permits would not be issued during periods of known high traffic volumes and permits would include conditions that ensure desired conditions for wilderness character are met. This permitting allowance is a decrease from alternative A, which would continue to allow up to five photo permits per day and additional separate filming permits. This action would reduce human disturbances to wildlife behavior and movement due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road. This change would result in a reduction of impacts on the undeveloped quality of wilderness from these uses due to fewer private vehicles and associated photography and filming activities (sometimes for long durations) along the Park Road. For example, decreased impacts on the natural viewshed as seen from wilderness lands could be expected.

Alternative D also includes provisions for separating the premium bus tours into short and long tours. While the long tours would continue to transportation nodes much farther west along the road corridor, the short tours would primarily terminate and turn around at Teklanika. Thus, under this alternative, the Teklanika transportation hub would likely experience an increase in off-bus

visitor activity, which could introduce higher levels of human presence and noises close to undeveloped wilderness.

Alternative D would include enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor. This increase in off-bus human presence and noise could alter undeveloped wilderness qualities in areas around the transportation nodes.

Under alternative D, a new Wildlife Viewing Subzone 3 would be added, between Eielson Visitor Center and Wonder Lake. This new zone would be managed for the lowest traffic volume on the Park Road and notable volume/use growth beyond current conditions would not be allowed. The undeveloped quality of wilderness character in this segment would be preserved more than under alternative A because this new zone would help ensure low future traffic volumes in this area. Natural sounds, a wild and remote experience, a contemplative setting, and natural viewsheds (i.e., without traffic in view) would be better preserved in the long term under this alternative.

Under alternative D, private vehicles that access the Teklanika River Campground would be required to travel westbound only during designated low traffic time periods (if necessary to meet desired conditions for management). Although a portion of this reduction in private vehicle use during peak periods might be replaced with an increase in buses on the road, this action would likely reduce overall peak traffic volumes. This would reduce the visual intrusions and noises caused by peak traffic volumes, and thus could reduce adverse effects on the undeveloped quality of immediately adjacent wilderness lands. Conversely, this action would also increase disturbances to wilderness during the periods of low levels of noise and visual disturbances (i.e., off-peak hours). In addition to introducing more adverse impacts during off-peak periods, this action could lead to an increase in nighttime traffic. Thus, the adaptive management efforts to control nighttime traffic levels may also be affected by this action at Teklanika River Campground.

Under alternative D, NPS staff and their guests could continue to use private vehicles on the Park Road. However, this vehicle use would only be allowed during low traffic volume periods. During high volume periods on the Park Road, NPS staff and guests would need to use the transit system. As with the changes to Teklanika River Campground access and professional photographer access, this adjustment of staff vehicle travel times and vehicle use would reduce road traffic during peak hours and reduce vehicle effects on the undeveloped quality of wilderness. However, this action would also increase disturbances to wilderness character during the periods of low levels of noise and visual disturbances (i.e., off-peak hours). In addition to introducing more adverse impacts during off-peak periods, this action could lead to an increase in nighttime traffic.

Also, under alternative D, vehicles and visitation would be managed in a way that would help meet the desired conditions of undeveloped wilderness quality through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, although the indicator and standard for vehicles at wildlife viewing stops would be intended primarily to minimize crowding for park visitors along the road, it could also benefit the undeveloped wilderness quality because it could help control and minimize the amount of human activity and unnatural conditions (e.g., vehicles) in the viewshed as seen and heard from the adjacent wilderness areas.

The preservation of these natural and human values directly supports wilderness character.

Under alternative D, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impacts on wilderness character along the Park Road corridor.

Natural. Under alternative D, the effects on the natural quality of the adjacent wilderness lands would be quite similar to those described under alternative A. However, the estimated increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the natural conditions and ecology of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would generate more overall noise and visual disturbances, which could disturb wildlife behavior and movement (as described in the "Wildlife Habitat" section).

The natural quality and ecology of adjacent wilderness lands would also be affected by other actions and results of implementing alternative D. Many of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative B include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-morning and late afternoon through evening;
- reduction in activity and traffic involving professional photographers and commercial filming;
- separation of the premium bus tours into short and long tours, with the short tours terminating at Teklanika (generating an increase in off-bus human activity);
- enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor;
- creation of a new Wildlife Viewing Subzone 3, between Eielson Visitor Center and Wonder Lake, that would be managed for the lowest traffic volume;
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods; and
- requirement that NPS staff and their guests only use private vehicles on the Park Road during low traffic volume periods (thus, reduced vehicle volumes during daytime peaks and increased vehicle volumes in off-peak periods).

All of the above bulleted components of alternative D would affect the natural quality and ecology of the wilderness lands adjacent to the road corridor. The resulting increases or decreases in vehicle traffic or off-bus human activity that result from these components of alternative D would primarily affect wildlife behavior and movement (due to increases or decreases in disturbances from human activity or noise). These effects are noted in more detail in the "Wildlife Habitat" section above.

Under alternative D, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. For example, the proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use

conditions might be negatively affecting the natural quality and ecology of wilderness areas along the road corridor.

The use of the sheep gap spacing indicator and standard would help ensure that large mammals of the park would be given an adequate amount of time between passing vehicles to cross the Park Road in an unobstructed, undisturbed manner, and thus maintain a more natural ecological system. Although the indicator and standard for vehicles at wildlife viewing stops would primarily be intended to minimize crowding for park visitors along the road, it could also benefit the natural quality of wilderness character by helping to control and minimize the amount of human activity that could disturb nearby wildlife.

The preservation of all of these natural and human values directly supports wilderness character. Under alternative D, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impacts on wilderness character along the Park Road corridor.

In addition to the monitoring done for the indicator and standards, alternative D would include provisions for additional monitoring of natural resource variables. Under alternative D, park staff would use the comprehensive monitoring programs and the completion of a BACI study to detect changes in other resource conditions, as discussed in the section on impacts on wildlife.

Given the inherent connections between wilderness values and natural systems, the comprehensive monitoring programs and adaptive management measures would help staff assess wilderness value conditions to make sure that natural processes and ecological connections are maintained.

Untrammeled. The implementation of alternative D and the associated management of the natural landscape along the road corridor and at transportation nodes would alter the untrammeled quality of some wilderness that is immediately adjacent to the corridor. The effects would be very similar to those described under alternative A.

Outstanding Opportunities for Solitude or Unconfined Recreation. Under alternative D, the effects on the opportunities for solitude or unconfined recreation on adjacent wilderness lands would be similar to those described under alternative A. However, the anticipated overall increases in vehicle volumes on the road and the associated increases in off-bus human activity around transportation nodes would increase the degree of the disturbances to the opportunities for solitude quality of adjacent wilderness lands. For example, the estimated 10.2% increase in seasonal bus volume would generate more overall noise and visual disturbances, which would make nearby human presence more evident to wilderness users. In addition, the estimated increase in off-bus activity at, or radiating from, transportation nodes would diminish feelings of primitive isolation, privacy, and solitude. These increases in human and bus traffic would have adverse effects on the opportunities for solitude quality of the wilderness character.

Opportunities for solitude would also be affected by other actions and from implementing alternative D. Many of these changes are described in the analysis of the "undeveloped" wilderness quality above. These actions and effects of alternative D include

- reduction of bus volumes on the road during the peak daytime hours and distribution of the volume throughout the day, including filling in the midday lull and creating longer periods of bus activity during the early- to mid-

morning and late afternoon through evening;
- reduction in activity and traffic involving professional photographers and commercial filming;
- separation of the premium bus tours into short and long tours, with the short tours terminating at Teklanika (generating an increase in off-bus human activity at Teklanika);
- enhancements on premium tours that could involve more guided off-bus activities at transportation nodes along the full length of the corridor;
- creation of a new Wildlife Viewing Subzone 3, between Eielson Visitor Center and Wonder Lake, that would be managed for the lowest traffic volume;
- requirement that private vehicles that access the Teklanika River Campground travel westbound only during designated low traffic time periods; and
- requirement that NPS staff and their guests only use private vehicles on the Park Road during low traffic volume periods (thus, reduced vehicle volumes during daytime peaks and increased vehicle volumes in off-peak periods).

All of the above bulleted components of alternative D would affect the opportunities for solitude or unconfined recreation on adjacent wilderness lands. The anticipated increases or decreases in bus volume or off-bus human activity that result from these components of alternative D would primarily lead to increases or decreases in disturbances and human encounters for those seeking solitude, isolation, and privacy in wilderness.

Under alternative D, vehicles and visitation would be managed in a way that would help meet the desired conditions of wilderness character through the use of indicators and standards and adaptive management actions. The proposed standards for nighttime traffic levels, sheep gap spacing, and the number of vehicles at wildlife viewing stops would help determine if vehicle use conditions might be negatively affecting wilderness character in wilderness areas along the road corridor. For example, the nighttime traffic level indicator and standard would help minimize impacts on wilderness character by controlling road disturbances during times when expectations for solitude and natural quiet are highest for the visitor.

Under alternative D, these indicator variables would be monitored and measured through a formalized monitoring program and process. When the minimum standards for each of these indicators are exceeded, an appropriate adaptive management action would be triggered to avoid further adverse impacts on wilderness character along the Park Road corridor.

Overall, due to the above effects on the four qualities of wilderness character, alternative D would have a local, long-term, moderate, adverse effect on wilderness character. All four wilderness qualities of the surrounding wilderness lands along the Park Road corridor would be adversely affected in some way (i.e., opportunities for wilderness solitude and the undeveloped, natural, untrammeled qualities of wilderness). These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to opportunities for solitude and undeveloped, natural, and untrammeled wilderness conditions due to possible increases in bus traffic and increased off-bus activity at transportation nodes. However,

alternative D would also provide some benefits to wilderness character, such as improving habitat monitoring and protection along the road via the use of adaptive management measures. These measures would include indicators, standards, comprehensive monitoring programs, and some reductions in private vehicle use that would help minimize traffic noise and visual disturbances. The limit of 160 vehicles on the Park Road per day would also help limit traffic disturbances to wilderness.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the Park Road corridor have had and will have notable effects on wilderness values in the area. These projects and actions are described and summarized in the "Alternative A" section above.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, adverse, and local to regionwide impacts on wilderness in the park.

When the effects of alternative D actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and local to regionwide cumulative impact on wilderness. Alternative D would contribute a substantial, long-term, adverse increment to this cumulative effect on wilderness.

Conclusion

Alternative D would result in a local, long-term, moderate, adverse effect on opportunities for solitude and the undeveloped, natural, untrammeled qualities of the surrounding wilderness lands along the Park Road. These adverse effects would primarily relate to the continued (and occasionally increased) visual and noise disturbances to wilderness and the area's ecological system from vehicle use along the road, unnatural conditions, and concentrated human activity. When compared to alternative A, this alternative could worsen the disturbances to solitude and natural conditions due to possible increases in bus traffic and increased off-bus activity. However, alternative D would also improve the preservation of wilderness character compared to alternative A from actions such as adaptive management measures and some reductions in private vehicle use.

PARK MANAGEMENT AND OPERATIONS

METHODOLOGY AND ASSUMPTIONS

The effects of implementing the alternatives on park staffing, facilities, and operations (including concessions) were evaluated. The analysis was conducted in terms of how NPS operations might vary under the different management alternatives. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the context, intensity, duration, and type of potential impacts.

Measure

The ability to conduct emergency response, law enforcement, interpretation, routine maintenance, natural and cultural resources management, commercial services administration, and other duties and responsibilities with Denali National Park and Preserve.

Intensity Definitions

Minor. Effects on park management and operations would be slight, with little change in the park's ability to provide emergency response, law enforcement, interpretation, routine maintenance, natural and cultural resources management, commercial services administration, inholder access administration, and other duties and responsibilities in a cost-effective manner.

Moderate. Effects on park management and operations would have measurable consequences for the park's ability to provide emergency response, law enforcement, interpretation, routine maintenance, natural and cultural resources management, commercial services administration, inholder access administration, and other duties and responsibilities in a cost-effective manner.

Major: Effects on park management and operations would have considerable consequences for the park's ability to provide emergency response, law enforcement, interpretation, routine maintenance, natural and cultural resources management, commercial services administration, inholder access administration, and other duties and responsibilities in a cost-effective manner.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Analysis

Under this alternative, vehicle use on the restricted section of the Park Road would continue to be managed to maintain the 10,512 seasonal limit that was set in the 1986 general management plan and then formalized in regulations in 2000. Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. Road maintenance requirements would not change, and park divisions would continue to operate in their current capacities. This alternative would not require changes in staffing, infrastructure, or budget.

The 1,754 permits allocated for NPS operations might not always be adequate for park management, causing delays or a lack of flexibility for the staff to navigate in the park. This could result in long-term, minor, adverse impacts on park management and operations along the Park Road.

Cumulative Impacts

Past planning documents such as the 1983 *Development Concept Plan* and its addendum,

the 1986 *General Management Plan*, and the 1997 *Entrance Area and Road Corridor Development Concept Plan* proposed upgrades to, or replacement of, park facilities; co-locating facilities near the hotel; new construction; changes to the entrance; improvements to the circulation system (including the shuttle system and capping traffic levels); and improvements to park operation procedures. Implementing these proposals improved the way the park provided for visitor services, resource protection, maintenance, and park administration. Similarly, contracting out the shuttle system in the mid-1990s, constructing new visitor facilities in the park's entrance area, developing rest stops, maintaining the road, developing new trails, and adding to visitor services improved and added to the park's infrastructure. These actions resulted in parkwide, long-term, major, beneficial impacts on park management and operations. However, construction and maintenance projects sometimes disrupt park operations, cause traffic delays and ground disturbance, degrade air quality due to dust, and introduce noise pollution that must be managed. These impacts on park management and operations would be local, short-term, minor, and adverse. Future road maintenance projects, such as the proposed Porcupine Forest road rehabilitation project, could add similar cumulative effects.

The park is surrounded by state, other federal agencies, and local boroughs. These entities work together to support collaborative agreements and strategies with the state and other federal agencies for resource protection, wildfire management, maintenance, and visitor protection. These collaborative strategies would continue. The Interpretation Division would continue to offer programs to special interest groups in the region and educational programs at the Denali Borough School District. The Concessions Division would continue to oversee concession contracts and coordinate with concessioners. The Maintenance Division would continue to maintain buildings and utilities in the road corridor and the Park Road itself according to established design standards. Implementing the park education and business plans would allow interpreters and park managers to more strategically deploy fiscal and personnel resources. The cruise ship and rail industries would continue to transport thousands of visitors to the park, ensuring steady revenue for the park and concessioners. These impacts would continue to be parkwide, long-term, major, and beneficial.

Executing the 2006 *South Denali Implementation Plan* with its new south side destination could alter how visitors use the park, requiring changes to law enforcement, interpretation, and maintenance services. The park would have to modify how it provides law enforcement, emergency response, and interpretive services and there potentially could be increased maintenance needs. However, projected economic development at the new access points could change the services needed through concessioners, and increased revenues could minimize impacts on the park's ability to provide services to visitors. As a result, there would be long-term, major, beneficial impacts on park management and operations.

When these past, present, and future actions are combined with the long-term, minor, adverse impacts of alternative A, the cumulative effects under alternative A would be short-term, moderate, and adverse and long-term, major, and beneficial. The no-action alternative would contribute minimally to these effects.

Conclusion

In general, continuing park operations under the no-action alternative would have local, long-term, minor, adverse impacts on park operations along the Park Road. Changes in park staffing, infrastructure, and budget would not be needed to implement this alternative.

ALTERNATIVE B

Analysis

This alternative would promote maximized seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road. Visitors would have access to a highly structured transportation system that offers predictability, efficiency, and greater opportunity to have a park experience of choice, while meeting set standards for natural resource protection and visitor experience. Management zones along the Park Road would remain as described in the 1997 *Entrance Area and Road Corridor Development Concept Plan*.

Under this alternative, many of the park division functions would remain the same. However, the addition of the economy tours could affect the duties and responsibilities of some divisions. The Park Service might conduct a study to explore the effects of larger buses than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika). The Superintendent's Office, Administrative Division, and Maintenance Division functions would largely remain the same as those described under alternative A. Therefore, alternative B would have parkwide, long-term, neutral impacts on the Superintendent's Office; the Center for Resources, Science, and Learning; and the Maintenance Division as their functions relate to managing the Park Road.

Under alternative B, the transit and self-guided economy tour services would be combined on the same bus to provide the greatest number of visitors an affordable option for accessing the park. Transit riders would depart from the Wilderness Access Center, while tour riders would depart from the Denali Visitor Center. It is anticipated that many visitors would elect to take the economy tour (over the transit service) because (1) additional interpretation materials would be provided, which would add to the visitor experience; and (2) the tickets would cost less than premium tours. The Park Service envisions that, while the number of visitors electing to take short and long premium tours might decrease, a core group of visitors would continue to choose this option with its greater visitor services.

On a short-term basis, the Interpretation Division would need to dedicate additional staff to develop interpretive materials for the new tour. In the short term and long term, the added responsibilities of operating the new economy bus tours would increase the amount of time the Concessions Division would need to coordinate with the concessioner in scheduling and operating the tours, which could strain the current staff's ability to carry out other division functions. The increased number of individuals taking the economy tour also would increase the amount of time and energy the Interpretation Division and/or concessioner would need for taking reservations, issuing tickets, and creating and dispensing interpretive materials. Adding more NPS and/or concession staff (possibly supported by increased revenues from the new tour) would reduce the intensity of adverse impacts.

Having NPS access to duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) via an employee shuttle system and having employee guests use the transit system would reduce the number of private vehicles on the Park Road and allow greater flexibility in managing the transportation system. However, employees and guests would need to plan their transit activities to conform to shuttle and transit schedules (and the availability of seats on transit/tour buses). Managing contractors and NPS vehicle use to minimize displacement of visitors could make planning activities within the park (e.g., research and interpretive programs) logistically challenging.

Combining the professional photography and commercial filming permitting programs would increase the efficiency of managing these programs. Requiring visitors in RVs to

access Teklanika River Campground during designated times would require additional oversight, but phasing in tents-only camping and requiring campers to access the campground via the transit/tour system would eliminate the need to oversee the current program, which allows RV access with a three-night permit. Under alternative B, a formal program using indicators, standards, and adaptive management tools would be instituted to monitor resource conditions and visitor experience. This program would require additional staff and hardware for monitoring and data analysis, as estimated in appendix B. The program would provide park staff consistent and reliable data on the condition of sensitive resources and values. This would allow the park staff to plan and allocate human and fiscal resources and to proactively adapt management actions as needed. This approach would require a substantial change in how vehicles are managed along the Park Road, including some investment in staffing to ensure adequate resources are available to effectively conduct park operations.

While there could be some short-term, moderate, adverse impacts on park operations and management from implementing a new vehicle management program, it is ultimately anticipated that alternative B would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects.

Cumulative Impacts

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative B would be the same as those under alternative A. When combined with the long-term, moderate, beneficial impacts of alternative B, the cumulative effects would be long-term, moderate, and beneficial. Alternative B would contribute substantially to these impacts.

Conclusion

While there could be some short-term, moderate, adverse impacts on park operations and management from implementing a new vehicle management program, it is ultimately anticipated that alternative B would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects.

ALTERNATIVE C

Analysis

This alternative would promote a variety of visitor opportunities that range from brief experiences in the park's entrance area, to short and long visits along segments of the Park Road, to multiday experiences in the park's backcountry. Visitors would have opportunities for spontaneity and freedom during their park visit, while set standards for resource conditions and visitor experience would be met. A Wildlife Viewing Subzone 3 would be created west of Eielson Visitor Center to Wonder Lake, which would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition.

The functions of the Superintendent's Office and Administration Division would remain largely the same as they are under the no-action alternative. Concession and Interpretation Division staff may experience some changes relative to the no-action alternative due to the resources needed for tour bus reservations, scheduling, operations, tailoring premium tours for specific needs, and issuing tickets for three separate bus systems (transit, economy tours, and premium tours). There would be increased staff demands on the Interpretation Division to produce interpretive materials for the economy and premium tours. There would be additional demands on the interpretation staff should NPS naturalists be used as narrators on premium tours. Time and funding would be

needed to ensure adequate training and review of naturalists or concession drivers so that they meet the standards needed for the premium tours.

Under alternative C, NPS employees could use personal vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake) during periods of low traffic volume and use the transit system during periods of high traffic volume. This would limit flexibility in getting to and from duty stations when compared to alternative A, and during periods of high traffic volume employees would need to plan their transit activities to conform to shuttle and transit schedules (and the availability of seats on transit/tour buses). Managing contractors and NPS vehicle use to minimize displacement of visitors could make planning activities within the park (e.g., maintenance, research, and interpretive programs) logistically challenging.

The professional photography and commercial filming programs would be merged to increase efficiencies in administration and oversight. Requiring visitors to access Teklanika River Campground during periods of low traffic volume would not change the management needed to oversee this program. In addition, the formal program using indicators, standards, and adaptive management tools outlined in the analysis presented for alternative B would be implemented under alternative C. This program would require additional staff and hardware for monitoring and data analysis, as estimated in appendix B. This approach would require a substantial change in how vehicles are managed along the Park Road, including some investment in staffing to ensure adequate resources are available to conduct other park operations.

While there could be some short-term, moderate, adverse impacts on park operations and management as a result of implementing a new vehicle management program, it is anticipated that alternative C would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects.

Cumulative Impacts

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative C would be the same as those under alternative A. When combined with the long-term, minor, beneficial impacts of alternative C, the cumulative effects would be long term, moderate, and beneficial. Alternative C would contribute somewhat to these impacts.

Conclusion

It is ultimately anticipated that alternative C would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects. There would be some short-term, moderate, adverse impacts on park operations and management as a result of limiting staff travel during high volume periods.

ALTERNATIVE D

Analysis

This alternative would promote maximized seating on all transit and tour vehicles to offer the largest number of visitors the opportunity to travel the Park Road, while remaining under a total daily limit of 160 vehicles. Visitors would have access to a highly structured transportation system that offers predictability, efficiency, and greater opportunity to have a park experience of choice, while meeting set standards for natural resource protection and visitor experience. A Wildlife Viewing Subzone 3 would be created west of Eielson Visitor Center to Wonder Lake, which would be managed for the lowest traffic volume on the Park Road and would not allow significant growth beyond the current condition.

Under this alternative, many of the park division functions would remain the same. The Park Service might conduct a study to explore the effects of larger buses than the current design for use in Wildlife Viewing Subzone 1 (Savage River to Teklanika). The Superintendent's Office, Administrative Division, and Maintenance Division functions would largely remain the same as those described under alternative A. Therefore, alternative D would have parkwide, long-term, neutral impacts on the Superintendent's Office; the Center for Resources, Science, and Learning; and the Maintenance Division as their functions relate to managing the Park Road.

During periods of low traffic volume, NPS employees could use private vehicles to access duty stations on the restricted portions of the Park Road (Savage River to Wonder Lake). During periods of high traffic volume, employees would use an employee transportation system. Employees and guests might have to plan their transit activities to conform to shuttle and transit schedules (and the availability of seats on transit/tour buses) depending on the traffic volume on a given day, which would require more flexibility in their travel plans. Managing contractors and NPS vehicle use to minimize displacement of visitors could make planning activities within the park (e.g., research and interpretive programs) logistically challenging.

Combining the professional photography and commercial filming permitting programs would increase the efficiency of managing these programs. Depending on traffic levels, visitors in private vehicles might be restricted from driving to and from Teklanika River Campground during designated times, requiring additional oversight.

Under alternative D, a formal program using indicators, standards, and adaptive management tools would be instituted to monitor resource conditions and visitor experience, and maintain vehicle levels below the maximum of 160 per 24-hour period. This program would require additional staff and hardware for monitoring and data analysis, as estimated in appendix B. The program would provide park staff consistent and reliable data on the condition of sensitive resources and values. This would allow the park staff to plan and allocate human and fiscal resources and to proactively adapt management actions as needed. This approach would require a substantial change in how vehicles are managed along the Park Road, including some investment in staffing to ensure adequate resources are available to effectively conduct park operations.

While there could be some short-term, moderate, adverse impacts on park operations and management as a result of implementing a new vehicle management program, it is ultimately anticipated that alternative D would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects.

Cumulative Impacts

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative D would be the same as those under alternative A. When combined with the long-term, moderate, beneficial impacts of alternative D, the cumulative effects would be long-term, moderate, and beneficial. Alternative D would contribute substantially to these impacts.

Conclusion

While there could be some short-term, moderate, adverse impacts on park operations and management from implementing a new vehicle management program, it is anticipated that alternative D would increase the effectiveness and efficiency of managing vehicles along the Park Road, resulting in long-term, minor, beneficial effects.

SOCIOECONOMICS

METHODOLOGY AND ASSUMPTIONS

This impact topic focuses on the effects of the alternatives on communities, the local/regional economy, and public facilities and local governance. This assessment is primarily qualitative, relying on informed judgment of park staff.

The reliance on qualitative assessments stems from uncertainty regarding projected operating expenditures, NPS and concessioner staffing, and visitor spending to support estimates of the numbers and types of jobs and incomes directly and indirectly supported by the transportation alternatives.

Future NPS outlays and staffing levels are uncertain as actual budgets would reflect future NPS policies, actual on-the-ground conditions and levels of visitor use, the availability of unanticipated funding opportunities, and Congressional budget approvals for the Park Service in general, or Denali specifically.

Uncertainty also exists regarding the cost of the transportation system. Under any of the alternatives, the transportation system would continue to be operated by a concessioner on a financially self-sustaining basis under a contractual arrangement. Future changes in system costs associated with the implementation of an alternative could result in differences in fares as compared to current prices; fares might vary between alternatives, and among trip and tour type due to differences in operating costs, services offered, and system use and efficiency. It is assumed that any differences in fares from current fares would not be sufficient to affect the level of visitor use.

Measure

Foreseeable effects identified in conjunction with this plan would stem from three primary sources

- changes in park or concessioner staffing to provide transportation services at the park
- changes in operating expenditures related to provision of transportation services
- changes in the levels of visitor spending

Intensity Definitions

Minor. Effects on concessioners, other private businesses, nearby communities, other affected governmental agencies, local community infrastructure, and social conditions would be small, geographically localized, affect few people, comparable in scale to typical year-to-year or seasonal variations, and not expected to substantively alter established social or economic structures.

Moderate. Effects on concessioners, other private businesses, nearby communities, other affected governmental agencies, local community infrastructure, and social conditions would affect many people, and could have effects on the established economic or social structure and conditions.

Major. Effects on concessioners, other private businesses, nearby communities, other affected governmental agencies, local community infrastructure, and social conditions would affect a large segment of the population, and would have a substantial influence on the established social or economic conditions.

ALTERNATIVE A (NO-ACTION ALTERNATIVE)

Analysis

Maintaining current transit and tour system operations under the no-action alternative would occur against a backdrop of other economic, demographic, and social change affecting the surrounding area. Demographic projections prepared by the state of Alaska portend population declines in Denali Borough through 2030 (see figure 24). Under the "low" growth scenario, which assumes long-term out-migration due to population aging and a lack of major new natural resource development, the borough's population would decline by more than 500 residents through 2030, a decline of more than 27%. A "high" growth option, which assumes renewed net immigration in the state, but with no specific cause specified, would see population remain near present levels through 2015, then decline to about 1,740 in 2030 (Alaska DLWD 2009).

Corresponding long-term population forecasts for the state indicate total net gains ranging between 66,000 (8%) and 127,000 (31%) residents. Virtually the entire projected net increase in resident population would occur in the Anchorage, Matanuska-Susitna, and Fairbanks North Star boroughs.

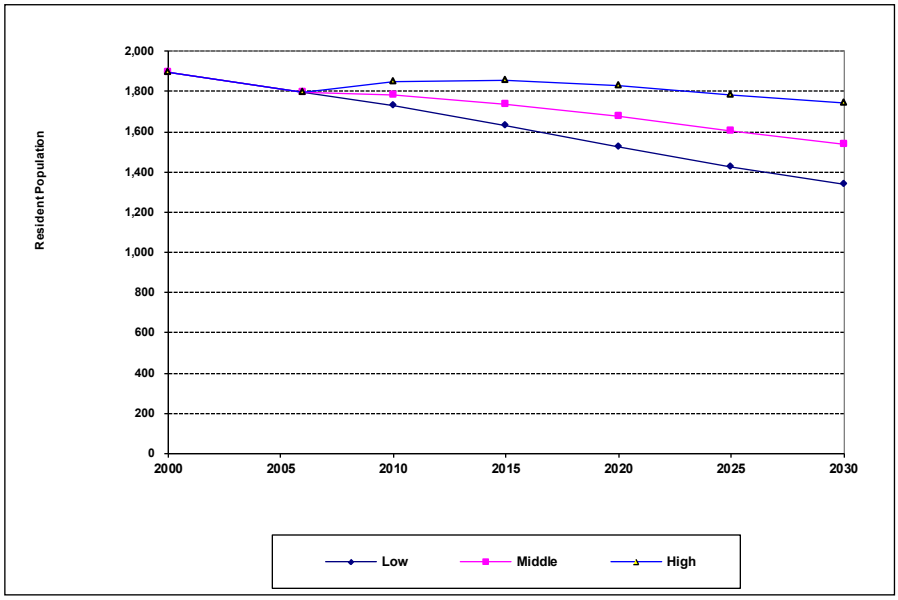
Implicit in these population forecasts are perspectives regarding underlying economic and demographic trends—little new economic opportunity coupled with net natural loss and/or out-migration in Denali Borough, in contrast to moderate economic expansion and immigration in the three more heavily populated boroughs. Economic growth, including more jobs in retail trade, services, health care, and residential construction, for example, will accompany the population growth in the latter.

In actuality, the economic outlook for the Denali Borough is tied closely to the levels of visitation to and NPS funding for park operations, along with several other major employers. Under the no-action alternative, the transit and tour system would continue in its current operational configuration (i.e., maintaining the same mix of tours and shuttle operations, number of trips allocated for inholders, and bus fleet).

Under the no-action alternative, long-term trends in annual visitor use at Denali would reflect general economic conditions, the domestic and international market for vacation travel to Alaska, the marketing and availability of capacity provided by the cruise industry and other land-based tour providers, and numerous other external and local influences. Given the uncertainties associated with these influences, forecasts of summer visits to the northern portion of the park prepared as part of this plan (benchmarked to actual 2007 and 2008 visitation) portray a reasonable range of outcomes for visitation over the next decade. Annual summer visitation under a low growth scenario, combining a sharp recession-related drop off in 2009 with assumptions of slow recovery in the cruise industry and land tours and slow growth in the number of independent travelers, would increase slightly, but remain nearly 20% below recent levels. A high growth scenario, assuming a combination of future increases in cruise capacity, aggressive marketing by the cruise companies to fill the available berths and spaces on the Denali land tours, and strong growth in the independent visitor market segment, would yield an increase of approximately 20% above 2007 visitation levels by 2018 (see figure 25).

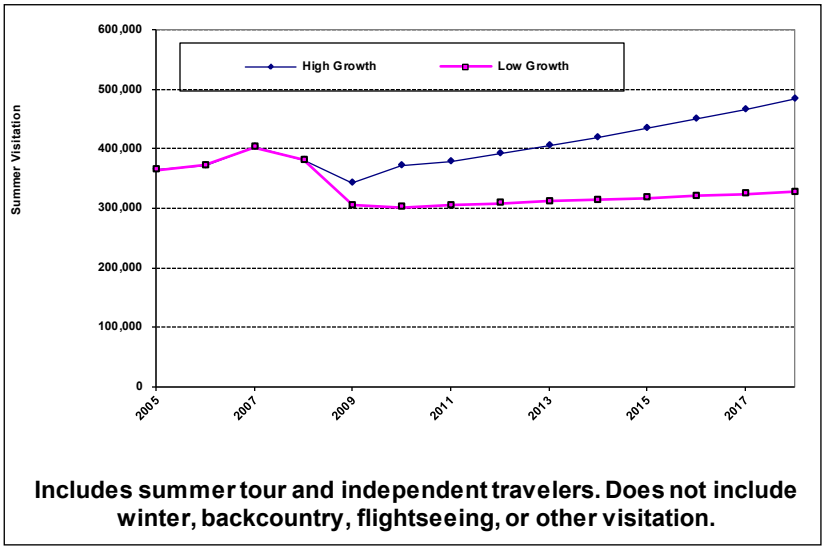
Although not evident in the above forecasts, recreation visitation to Denali would maintain its pronounced seasonality.

Figure 24. Projected Population of Denali Borough under Three Scenarios of Statewide Growth



Source: Alaska Department of Labor and Workforce Development 2007.

Figure 25. Forecasted Summer Visitation to Denali National Park and Preserve



Source: Denali Park Road – Alternatives for Vehicle Management (HDR 2009).

Regional Economy. The current transit and tour system operation provides a margin of underused capacity to accommodate increased ridership under the no-action alternative. Consequently, Denali National Park and Preserve, including the visitor transportation system, would continue to be a major contributor supporting the economic base of the Denali Borough in terms of jobs, income, and local government revenues. Park-related contributions to the regional economy would increase over time, in response to visitor use and increased ridership on the transit and tour system.

Park visitor spending at concession operations in the park, and at stores, motels and hotels, and other tourism-related businesses and attractions in the local area (Nenana Canyon and McKinley Village) would change in response to changes in recreation visitation. Entrance fee receipts collected in conjunction with tickets sold for the transit and tour system, as well as the levels of campground use, would generally track changes in recreation visitation. Park staff familiar with the current transit and tour system see a potential for increased visitor use under the high growth scenario that could eventually tax the capacity of the current system.

Implementing the no-action alternative would sustain the park-related economic infusion to the region associated with transit and tour system-related park administration and concessioner operation expenditures over the life of this plan. Some increases in concessioner staffing could be required to accommodate increased ridership under the no-action alternative. The infusion would result from ongoing system operating expenditures, including staff payroll, operating and maintenance expenditures, capital outlays, and the costs for employee housing, dining, and fringe benefits. No major changes in NPS staffing levels or budgeted resources to fund park administration of the concession operated transit and tour system would be anticipated under the no-action alternative.

Implementation of the no-action alternative would not dramatically alter the region's economic dependency on seasonal tourism.

Population and Demographics. Long-term population forecasts for the Denali Borough portray a future ranging from a degree of long-term stability to steady decline. Long-term visitation forecasts for the park suggest that this plan would provide a stabilizing influence for the borough's resident population under the no-action alternative. At the same time, meeting the demands of park visitors would sustain the strong seasonal influence exerted by overall visitation that results in the attraction of 1,500 to 2,000 temporary workers to the area during the summer. Staffing for the transit and tour system, which contributes to that influx, would continue at approximately current levels. However, that influence may be insufficient to offset declines emanating from other sectors of the economy or underlying demographic trends.

Public Facilities and Services and Local Governance. Changes in park-related demands on community services and facilities in Denali Borough and other nearby communities in Alaska would accompany increases in future visitation, but there would be little direct or indirect effects related to the transit and tour system operation under the no-action alternative. The local solid waste management operation and fire protection / emergency medical responders would, for example, see an increase in demand from visitors traveling through the area and staying in local hotels, motels, or in second homes. The added demands, dispersed over time and location, would not likely require additional capacity or staffing.

Overnight lodging tax revenues generated by visitor spending are a vital revenue source for Denali Borough, supporting borough governance, local public education, and various public facilities and services. Annual receipts would likely increase under the no-action alternative due to an increase in the

level of visitor use, and the indirect effects of that increase in raising average nightly room rates.

Cumulative Effects

From an economic and social perspective, it is not possible to readily isolate the park from past, present, and future economic and community development in the surrounding area. Past human activity and development actions in and near the park are largely responsible for existing land use and development patterns, and for existing transportation facilities that provide access to the park. Those uses and patterns are tied to the cultural and historical landscapes.

The primary past and ongoing actions related to current social and economic conditions include

- redevelopment of the park entrance / frontcountry area
- closure of the Park Road beyond the Savage River Check Station to most private vehicles, and subsequent implementation of the concessioner-operated Visitor Transportation System
- completion of the George Parks Highway
- development of the cruise/tour market highlighting the park, the associated rail and bus transportation linkages to Anchorage and Fairbanks, and the commercial services and lodging base in Nenana Canyon

These actions correspond with, and in many cases facilitated, the increases in visitor use that underlie current social and economic conditions in the area. Manifestations of the cumulative effects of these actions include year-round and seasonal employment and population in the area; established economic linkages to Fairbanks, Talkeetna, and Anchorage; and local public facilities and services. These effects would be local and regional, long-term, major, and beneficial. Additional cumulative effects of future actions would include similar long-term, moderate, beneficial social and economic effects associated with implementation of the *South Denali Plan*, construction and maintenance of new trails in the frontcountry, and prospective future commercial development outside of the park. Long-term economic effects indirectly associated with the *South Denali Plan* may include increased visitor use to the park, beyond that occurring in the northern portion of the park, with correlative benefits for visitor-related businesses in the Talkeetna area. Combined with these effects, the no-action alternative would result in long-term, major, beneficial, local and regionwide cumulative effects. The no-action alternative would contribute substantially to these effects.

Conclusion

Continuation of the current Visitor Transportation System under the no-action alternative would have little, if any, effect on future local population growth, but would contribute to the major. temporary, seasonal population influx to the local area. Alternative A would sustain existing linkages between park visitation, transit and tour system operations, the local and regional economy, local communities, public facilities and services, and local government revenues over the foreseeable future. These linkages and their effects are long-term, major, and primarily beneficial at the local level, and long-term, moderate, and beneficial at the regional level.

ALTERNATIVE B

Analysis

Implementing alternative B would occur against the same backdrop of economic, demographic, and social conditions in the region, including the underlying market for

tourism/travel to Alaska, as the no-action alternative. The effects of alternative B would add another set of influences affecting the region's economic and social environment, but would leave the foundation of the area's economic and demographic outlook unchanged.

Effects on the Local and Regional Economy. Implementation of alternative B would promote the provision of maximum seating on transit and tour buses continuing west beyond the Savage River Check Station. Transportation services provided under alternative B would include scheduled transit service and self-guided economy tour options, sharing available seating on a bus, and guided premium short and long tours on tour buses, which offer visitors opportunities to understand the park's natural and cultural resources. Implementation of alternative B would be coupled with development of additional interpretive materials and programs. Some guided premium long tours could offer professional interpretive presentations and guided talks. Alternative B may result in capacity reallocation between the transit and premium services tours in response to demand, altering the mix of transit and tour buses. Buses with higher seating capacities might be suitable for use on premium short tours traveling as far as the Teklanika turnaround. Future conversion of the Teklanika River Campground to tents only would allow additional schedule and frequency flexibility to respond to net increases in overall visitor use and demand for transportation services.

Implementation of alternative B would sustain, and potentially increase, the economic contributions of Denali, supporting the economic base of the Denali Borough. Sources of the potential added economic stimulus include higher concessioner staffing and payrolls over time in response to expanded transit and system capacity, and changes in visitor spending. The economic contributions would consist primarily of local consumer expenditures, including additional outlays for lodging, food, and beverages.

Alternative B would not require any major capital outlays by the Park Service and only slightly higher operating expenditures and seasonal staffing levels. Some reassignment or changes in staff responsibilities may arise in conjunction with implementation of alternative B. No major increase in budgeted funds for NPS operations is assumed for alternative B. Available resources would include base budget appropriations, concession revenues, and entry and camping fees.

Concessioner staffing levels are generally a function of the number of hours of bus operations, bus fleet size, and operational needs of the on-site reservation and ticketing system. In turn, annual hours of bus operations depend on future ridership and decisions about the mix of transit and tour departures, number of departures to various turnaround locations, and seating capacity of buses used on the short tours. The potential increases in the number of tours and extended travel distances for the premium tours under alternative B, as compared to current tours, suggest increases in concessioner transportation-related seasonal employment of up to 15% (as many as 50 positions) over time. Increases in the number of visitors accessing the Denali Visitor Center related to tour-origination or stops upon return would likely require additional food service staff. Future increases in concessioner staffing levels associated with the changes in transit and tour system operations would continue long term and would result in additional concessioner expenditures related to system operations (e.g., payroll, fuel, and utilities), and for dining, housing, and other employee - related expenses. Additional employee housing may be required. A portion of the expanded payroll would flow into the local economy in the form of consumer expenditures.

Lodges, RV parks, and other businesses in the area may also increase staffing to provide shuttle service from Nenana Canyon to the Wilderness Access Center and Denali Visitor Center for guests accessing the transit/self-guided economy and premium short tours, respectively.

Total visitor spending in the local economy would increase assuming implementation of alternative B. Much of higher spending would stem from transit and tour fares set to cover system operational costs. Additional spending may be realized at the food service area and at the Alaska Geo retail outlets at the Denali Visitor Center and Toklat Rest Stop as a result of the higher number of visitors accessing these locations. Some of this spending would likely be a redistribution of spending that would have otherwise occurred at establishments in the local area outside the park.

Alternative B could indirectly result in increased total visitor spending in the local area if the enhancement in visitor experiences associated with the premium tours, off-bus recreational and educational opportunities, and options for the economy tours result in extended duration of stay by those visitors, changes in visitor demographics, or higher levels of visitor use. Locally, stores, motels and hotels, and other tourism-related businesses and attractions in the local area (Nenana Canyon and McKinley Village) would be the beneficiaries of the increases in spending. At the regional level, the Alaska Railroad and bus transportation and tour companies transporting visitors to and from the park would also benefit. The likelihood and potential magnitude of such changes cannot be forecast with any degree of certainty, but are a reasonable effect associated with alternative B.

Alteration of the seasonal pattern of visitation may be associated with the potential capacity increases and changes in system operations from implementing alternative B.

The indirect effects of future increases in concessioner employment would include increases in secondary seasonal employment within the local economy. Labor earnings paid by local employers would also increase, but a substantial portion those earnings would leave with the employees at the end of the season.

Entrance fees collected in conjunction with the ticket sales for the transit and tour system, the sale of various annual passes, and camping fee receipts would generally reflect changes in recreational visitation to the park. Over time, some limited reduction in camping fee receipts could occur as RV camping is displaced from the Teklanika River Campground, with the net effect depending on whether such use is accommodated at the Riley Creek campground or shifts outside the park.

Implementation of alternative B would maintain overnight lodging access on the Park Road to Kantishna inholders at current allocation levels in the general management plan. Additional day use access needs would be met via the transportation system. The net effect of these access provisions would be to sustain current commercial overnight lodging operations and provide for additional day use with a combination of traditional and transit and tour system access.

Effects on Population and Demographics. Implementation of alternative B would have little impact on long-term population growth in the area. The direct increases in park and concessioner employment would be minor, as would indirect employment gains due to direct increases and changes in visitor spending and visitor use. Because of the seasonal nature of the employment, few job seekers would relocate to the area on a permanent basis. Rather, the majority of the job holders would be seasonal residents, typically arriving to the area in early/mid-May and departing in September. As is currently the case, many among the expanded crew of bus drivers would likely return year after year to work in the park.

The availability of other seasonal jobs tends to attract many younger, often college-aged, unmarried workers. Few children are among the seasonal immigrants. Implementation of alternative B would not alter these patterns.

Public Facilities and Services and Local Governance. Impacts on locally provided public facilities and services associated with implementation of alternative B would create additional demands on Denali Borough's administrative services, solid waste management, and emergency medical and fire protection services. The demands would be long-term, but limited in scale relative to the demands associated with the current year-round and seasonal populations in the local area. The incremental demands, dispersed over time and location, would not likely require additional capacity or staffing.

Implementation of alternative B would have no effect on public education in Denali Borough due to the seasonal nature and timing of the tourism season.

Overnight lodging tax revenues generated by visitor spending are a major revenue source for Denali Borough, supporting borough governance, local public education, and various public facilities and services. Annual receipts would likely increase under alternative B due to an increase in the level of visitor use, and the indirect effects of that increase in raising nightly room occupancy rates.

Cumulative Impacts

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative B would be the same as those under alternative A. The cumulative effects from an economic and social perspective including alternative B, would be local and regional, long-term, major, and beneficial. Alternative B would contribute substantially to these effects.

Conclusion

The economic effects, including those on employment and income, related to alternative B would be local and regional, long–term, major, and beneficial. Long-term social consequences include major increases in temporary/seasonal population and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area.

When compared to alternative A, alternative B would result in minor incremental beneficial effects stemming from the increases in park, concessioner and indirect employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to occur upon implementation of alternative B.

ALTERNATIVE C

Analysis

Implementing alternative C would occur against the same backdrop of economic, demographic, and social conditions in the region, including the underlying market for tourism/travel to Alaska, as the no-action alternative. The effects of alternative C would add another set of influences affecting the region's economic and social environment, but would leave the foundation of the area's economic and demographic outlook unchanged.

Effects on the Local and Regional Economy. Implementation of alternative C would promote the provision of a

transportation services along the Park Road to offer a variety of visitor experiences.

Transportation services provided under alternative C would include three distinct options—transit service similar to that currently provided, self-guided economy tours via a dedicated bus system, and guided premium tours. The transit and self-guided economy tours would reach various destinations along the Park Road. Transit service schedules would provide some opportunity for transferring between buses to continue travel further into the park. Specially focused tours and activities could be offered on some guided premium long tours, with the size of tour group accommodated tailored to demand and the operational needs and constraints of the tour program. Accommodating smaller-sized tours could result in a minor decrease in overall potential seating capacity on transit and tour buses headed west on the Park Road beyond the Savage River Check Station (mile 15). That effect may be offset in part, by more efficient capacity use on the other trips achieved by closer matching between supply and demand.

Implementation of alternative C would sustain, and potentially increase, the economic contributions of Denali, supporting the economic base of the Denali Borough. Sources of the added economic stimulus could include changes in concessioner staffing levels and changes in visitor spending. The economic contributions would consist primarily of local consumer expenditures, including additional outlays for housing.

Alternative C would not require any major capital outlays by the Park Service and only slightly higher operating expenditures and seasonal staffing levels. Some reassignment or changes in staff responsibilities may arise in conjunction with implementation of alternative C. No major increase in budgeted funds for NPS operations is assumed for alternative C. Available resources would include base budget appropriations, concession revenues, and entry and camping fees.

Staffing levels for the concessioner are generally a function of the number of hours of bus operations, bus fleet size, and operation of the on-site reservation and ticketing system. The potential increases in the number of tours and extended travel distances for the premium tours, as compared to current tours, and operation of the transit service on a regular schedule suggest increases in concessioner transportation-related seasonal employment of up to 20% (as many as 70 positions) over time. Implementation of a shuttle system serving the entrance area to facilitate visitor access from the Denali Visitor Center to the Wilderness Access Center, and increases in the number of visitors accessing the Denali Visitor Center and food service operation, would likely also require additional staffing. Future increases in concessioner staffing levels associated with the changes in transit and tour system operations would continue long term and would result in additional concessioner expenditures related to system operations (e.g., payroll, fuel, and utilities), and for dining, housing, and other employee-related expenses. Additional employee housing may be required. A portion of the expanded payroll would flow into the local economy in the form of consumer expenditures.

Total visitor spending in the local area would likely increase assuming implementation of Alternative C. Most of the additional spending would be in the form of fares set to cover the cost of system operations, including higher per-visitor costs related to smaller, focused tours. Additional spending may be realized at the food service establishment and at the Alaska Geo shops at the Denali Visitor Center and Toklat Rest Stop. Some of this spending would likely be a redistribution of spending that would have otherwise occurred in the local area outside the park.

Implementation of alternative C could indirectly result in increased total visitor

spending in the local area if the enhancement in visitor experiences associated with the guided premium long tours, off-bus recreation, and options for the self-guided economy tours result in extended duration of stay by those visitors, changes in visitor demographics, or higher levels of visitor use. Locally, stores, motels and hotels, and other tourism-related businesses and attractions in the local area (Nenana Canyon and McKinley Village) would be the beneficiaries of the increases in spending. At the regional level, the Alaska Railroad and bus transportation and tour companies would likely also benefit. The likelihood and potential magnitude of such changes cannot be predicted with any degree of certainty, but could be a reasonable outcome of alternative C. Implementation of alternative C would not result in any major changes in the seasonal pattern of visitor use.

The net effects of future increases in concessioner employment would include increases in secondary seasonal employment within the local economy. Labor earnings paid by local employers would also increase, but large portions those earnings would flow from the economy when the seasonal employees leave at the end of the season.

Entrance fees collected in conjunction with ticket sales for the transit and tour system, the sale of various annual passes, and receipts of camping fees would generally track changes in recreational visitor use.

Implementation of alternative C would maintain overnight lodging access to Kantishna inholders at current allocation levels in the general management plan. Additional access needs to Kantishna would be met via the transportation system, possibly involving coordinated pick up or drop off transfers with transit or economy tour buses at the Eielson Visitor Center and Wonder Lake turnaround.

Effects on Population and Demographics. Implementation of alternative C would have little impact on long-term population growth in the area. The direct increases in concessioner employment would be minor, as would indirect employment gains due to direct increases and changes in visitor spending and visitor use. Because of the seasonal nature of the employment, few job seekers would relocate to the area on a permanent basis. Rather, the majority of the job holders would be seasonal residents, typically arriving to the area in early/mid-May and departing in September. As is currently the case, many among the expanded crew of bus drivers would likely return year after year to work in the park.

The availability of other seasonal jobs tends to attract many younger, often college-aged, unmarried workers. Few children are among the seasonal immigrants. Implementation of alternative C would not alter these patterns.

Public Facilities and Services and Local Governance. Impacts on locally provided public facilities and services associated with implementation of alternative C would create additional demands on Denali Borough's administrative services, solid waste management, and emergency medical and fire protection services. The demands would be long term, but limited in scale relative to the current demands associated with the year-round and seasonal populations in the local area. The incremental demands, dispersed over time and location, are unlikely to require additional capacity or staffing.

Implementation of alternative C would have no effect on public education in Denali Borough due to the seasonal nature and timing of the tourism season.

Overnight lodging tax revenues generated by visitor spending are a major revenue source for Denali Borough, supporting borough governance, local public education, and various public facilities and services. Annual receipts would likely increase under alternative C due to an increase in the level of visitor use, and the indirect effects of that increase in raising average nightly room rates.

Cumulative Effects

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative C would be the same as those under alternative A. The cumulative effects, from an economic and social perspective including alternative C, would be local and regional, long-term, major, and beneficial. Alternative C would contribute substantially to these effects.

Conclusion

The economic effects related to alternative C, including the effects on employment and personal income, would be local and regional, long–term, major, and beneficial. Long-term social consequences include major temporary/seasonal population influxes and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area.

When compared to alternative A, alternative C would result in minor, incremental, beneficial effects stemming from the increases in park, concessioner and indirect employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to materialize upon implementation of alternative C.

ALTERNATIVE D

Analysis

Implementing alternative D would occur against the same backdrop of economic, demographic, and social conditions in the region, including the underlying market for tourism/travel to Alaska, as the no-action alternative. The effects of alternative D would add another set of influences affecting the region's economic and social environment, but would leave the area's fundamental economic and demographic outlook unchanged

Effects on the Local and Regional Economy. Implementation of alternative D would promote optimal use of all transit and tour vehicles to accommodate foreseeable levels of visitor use, offering those visitors an opportunity for a quality experience of choice in areas of the park along the Park Road. Alternative D also provides opportunities to expand the range of visitor experiences and to reallocate capacity to address changes in desired visitor experience choices over time.

Transportation services provided under alternative D include three distinct options — transit service similar to that currently provided, guided premium tours, and specialized educational programs offering more in-depth exploration of specific topics. The transit service would reach destinations along the full length of the Park Road. The guided premium short and long tours on tour buses would offer visitors opportunities to understand the park's natural and cultural resources. In addition to guided premium tours, specialized educational programs on a variety of topics would be conducted in cooperation with, or through, the Murie Science and Learning Center. Most of these specialized tours would be scheduled in advance because of the daily trip limits established under alternative D. Some of the specialized tours would be developed in concert with sponsoring organizations; others would be open to the public, with advance registration possible for a portion of the available capacity. The park would develop guidelines regarding the number of specialized tours and appropriate sponsoring organizations.

Implementation of alternative D would be coupled with development of additional

interpretive materials and programs. Some guided premium long tours could offer professional interpretive presentations and guided talks. The Murie Science and Learning Center would work with academic, professional, and other potential sponsors to develop informational materials and schedule specialized tours in cooperation with the concessioner. Such sponsored tours would likely require advanced scheduling and registration as part of group registration.

Alternative D may result in capacity reallocation between the transit and premium services tours to respond to demand, altering the mix of transit and tour buses. Buses with higher seating capacities might be suitable for use on premium short tours traveling as far as the Teklanika turnaround. At the same time, changes in bus configurations and provisions for carrying recreation equipment externally may prompt some changes in visitor use patterns. Implementation of time of day travel guidance for private vehicles accessing the Teklanika River Campground, as well as potential limitations on professional photography and commercial filming permits during periods of known high traffic volume, would provide additional schedule and frequency flexibility to respond to changes in overall visitor use and demands for transportation services.

Implementation of alternative D would sustain, and potentially increase, the economic contributions of Denali, supporting the economic base of the Denali Borough. Sources of the potential added economic stimulus include increases in concessioner staffing and payroll over time in response to expanded transit and tour system capacity, and increases in visitor spending resulting from additional visitor use attracted by the expanded range of experiences, including the specialized tours. The economic contributions would consist primarily of local consumer expenditures, including additional outlays for transportation, lodging, food, and beverages.

Alternative D would not require any major capital outlays by the Park Service and only slightly higher operating expenditures and seasonal staffing levels. Some reassignments or changes in staff responsibilities may arise in conjunction with implementation of alternative D. No major increase in budgeted funds for NPS operations is assumed for alternative D. Available resources would include base budget appropriations, concession revenues, and entry and camping fees.

The potential increases in the number of tours, changes in the mix of departures, extended travel distances for the premium tours (as compared to current tours), and the addition of specialized education and activity tours suggest increases in concessioner transportation-related seasonal employment of up to 20% (as many as 70 positions) over time. Increases in the number of visitors accessing the Denali Visitor Center related to tour origination or stops upon return would likely require additional staff at the food service operation. Future increases in concessioner staffing levels associated with the changes in transit and tour system operations would continue long term and would result in additional concessioner expenditures related to system operations (e.g., payroll, fuel, and utilities), and for dining, housing, and other employee-related expenses. Additional employee housing may be required. A portion of the higher payroll would flow into the local economy in the form of consumer expenditures.

Lodges, RV parks, and other businesses in the area may also increase staffing to provide shuttle service for guests between Nenana Canyon to the Wilderness Access Center and Denali Visitor Center.

Total visitor spending in the local area would increase assuming implementation of alternative D. Higher spending would stem from transit and tour fares set to cover the cost of system operation, the incremental costs associated with the specialized tours,

and the additional visitor use attracted by such tours. Additional spending may be realized at the food service operation and the Alaska Geo retail outlets at the Denali Visitor Center and Toklat Rest Stop. Some of this spending would likely be a redistribution of spending that would have otherwise occurred at establishments in the local area outside the park.

Implementation of alternative D could indirectly result in increased overall visitor spending in the local area if the enhancement in visitor experiences associated with the premium tours, including off-bus recreational and educational opportunities, and the specialized tours result in extended duration of stay by those visitors, changes in visitor demographics, or higher levels of visitor use. Locally, stores, motels and hotels, and other tourism-related businesses and attractions in the local area (Nenana Canyon and McKinley Village) would be the beneficiaries of the increases in spending. At the regional level, the Alaska Railroad and bus transportation and tour companies transporting visitors to and from the park would also benefit. The likelihood and potential magnitude of such changes cannot be forecast with any degree of certainty, but are a reasonable effect associated with alternative D.

Alteration of the seasonal pattern of visitation may be associated with the potential changes in system capacity and operations from implementing alternative D. Over time, the visitor mix could change slightly in response to changes in bus configuration, system operations, and range of experiences offered. Because the available accommodations in the area currently operate at capacity during the peak season, the combination of daily trip limits and scheduling flexibility under alternative D would allow the Visitor Transportation System to respond to change demand over time and to encourage more use during shoulder periods.

The indirect effects of future increases in concessioner employment would include increases in secondary seasonal employment within the local economy. Labor earnings paid by local employers would also increase, but a substantial portion of those earnings would leave with the employees at the end of the season.

Entrance fees collected in conjunction with the sale of tickets for the transit and tour system, fees for specialized educational tours, the sale of various annual passes, and camping fee receipts would generally reflect changes in recreational visitation to the park. Over time, some limited scale increase in camping fee receipts could occur as increased RV camping use is accommodated at the Riley Creek campground.

Implementation of alternative D would maintain overnight lodging access on the Park Road to Kantishna inholders at the current number of trips, as outlined in the general management plan. Commercial day tours to Kantishna would be operated under concession contract. The net effect of these access provisions would be to sustain current commercial overnight lodging operations and provide for additional day use with a combination of traditional and transit and tour system access.

Effects on Population and Demographics. Implementation of alternative D would have little impact on long-term population growth in the area. The direct increases in concessioner employment would be minor, as would indirect employment gains due to direct increases and changes in visitor spending and visitor use. Because of the seasonal nature of the employment, few job seekers would relocate to the area on a permanent basis. Rather, the majority of the job holders would be seasonal residents, typically arriving to the area in early/mid-May and departing in September. As is currently the case, many among the expanded crew of bus drivers would likely return year after year to work in the park.

The availability of other seasonal jobs tends to attract many younger, often college-aged, unmarried workers. Few children are among the seasonal immigrants. Implementation of alternative D would not alter these patterns.

Public Facilities and Services and Local Governance. Impacts on locally provided public facilities and services associated with implementation of alternative D would create additional demands on Denali Borough's administrative services, solid waste management, and emergency medical and fire protection services. The demands would be long-term, but limited in scale relative to the demands associated with the current year-round and seasonal populations in the local area. The incremental demands, dispersed over time and location, would not likely require additional capacity or staffing.

Implementation of alternative D would have no effect on public education in Denali Borough due to the seasonal nature and timing of the tourism season.

Overnight lodging tax revenues generated by visitor spending are a major revenue source for Denali Borough, supporting borough governance, local public education, and various public facilities and services. Annual receipts would likely increase under alternative D due to an increase in the level of visitor use, and the indirect effects of that increase in raising nightly room occupancy rates.

Cumulative Effects

Past, present, and reasonably foreseeable actions that would contribute cumulative impacts under alternative D would be the same as those under alternative A. The cumulative effects from an economic and social perspective including alternative D, would be local and regional, long-term, major, and beneficial. Alternative D would contribute substantially to these effects.

Conclusion

The economic effects, including those on employment and income, related to alternative D would be local and regional, long–term, major, and beneficial. Long-term social consequences include major increases in temporary/seasonal population and demands on community infrastructure and services. Potential long-term consequences would also include indirect effects on lodging tax revenue, a key revenue source for the Denali Borough. The net effect of the increases in demand and revenue on the borough would be beneficial given the existing facility and service capacity to serve current levels of seasonal visitation in the local area.

When compared to alternative A, alternative D would result in minor incremental beneficial effects stemming from the increases in concessioner employment, payroll, and other operating expenditures associated with the operation of the transit and tour system. The incremental effects would begin to occur upon implementation of alternative D.

UNAVOIDABLE ADVERSE IMPACTS

The Park Service is required to consider if the alternatives would result in impacts that could not be fully mitigated or avoided (NEPA section 101(c)(ii)). For any alternative, vehicle traffic and off-bus human activity along the Park Road would continue to have adverse effects on wildlife and wildlife habitat along the Park Road corridor, such as increased stress in individual animals, habitat fragmentation, and disturbances to foraging, movement, or caring for young.

Alternatives B, C, and D would involve a seasonal increase and a daily increase in bus volumes on the Park Road (assuming a full schedule). Although the use of indicators, standards, BACI studies, and adaptive management measures would help minimize the potential for adverse effects on wildlife associated with any increases, these effects would not be completely mitigated or avoided.

Under the no-action alternative, there could be unavoidable adverse impacts on visitor use and enjoyment. These impacts would relate to the limited availability of seats on eastbound buses to pick up hikers and campers and the associated wait times, limited changes in the ability to access park features, and the lack of a low-cost tour option (which affects both cost of access and access to park features).

Under alternative B, although most impacts on visitor use and enjoyment would be beneficial, unavoidable adverse impacts would occur from combining transit with an economy tour on the same bus and eliminating camper buses. These impacts could include difficulty for campers and hikers to find seats with adequate space for gear or concerns about seating availability that could affect opportunities for off-bus experiences; and the potential for phasing-in tents-only camping at the Teklanika River Campground, which would eliminate the opportunity for RV camping; and the potential for using larger buses (if studies show this could be done). These impacts might negatively affect comfort for some as a result of having to ride with more people.

As with alternative B, most impacts on visitor use and enjoyment under alternative C would be beneficial. However, some unavoidable adverse impacts could occur related to the inconvenience created by limiting access to the Teklanika River Campground to periods of low traffic volume.

Unavoidable adverse impacts could also occur on socioeconomic resources, but would be expected to be minimal. For example, all alternatives would contribute to major, temporary, seasonal population influx to the local area. For the most part, employers provide for the housing needs of the residents, limiting adverse impacts on the community. With the potential to accommodate more visitors (should the demand exist) under alternatives B, C, and D, there could be minor increases in temporary, seasonal population and demands on community infrastructure and services.

There would be unavoidable adverse impacts on the transportation system and traffic under the alternatives as well. Under alternative A, these impacts would be related to transportation system transit bus capacity and Tundra Wilderness Tour bus demand exceeding capacity some days during the peak season. Under alternative B, how people could access the park would be limited to transit or tour buses, leading to modest increases in passenger volumes.

Alternative C would have unavoidable adverse impacts on the transportation system due to the need to incorporate a separate self-guided tour bus system, the potential need to acquire different-sized buses to meet the demand of the premium tours, and the need for increased coordination among transit buses, self-guided tour buses, and premium tour buses.

SUSTAINABILITY AND LONG-TERM MANAGEMENT

In accordance with the National Environmental Policy Act, and as further explained in DO-12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*, consideration of long-term impacts and the effects of future options should be included throughout any NEPA document. According to DO-12, and as defined by the World Commission on Environment and Development, "sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their needs." For each alternative considered in a NEPA document, considerations of sustainability must demonstrate the relationship between local, short-term uses of the environment and the maintenance and enhancement of long-term productivity. The Park Service must consider if the effects of the alternatives involve tradeoffs of the long-term productivity and sustainability of park resources for the immediate short-term use of those resources. The Park Service must also consider if the effects of the alternatives are sustainable over the long term without causing adverse environmental effects for future generations (NEPA section 102(c)(iv)).

None of the alternatives described in this plan / environmental impact statement would involve facility development that could cause a loss of ecological productivity in the park, nor would any alternative affect the ability of the Park Service to conduct their operations sustainably. While the Park Road would continue to be used by the public under all alternatives described in this plan / environmental impact statement, the Park Service would seek opportunities to reduce fossil fuel consumption (via the use of alternative energy vehicles and other fuel-saving policies) which, over time, could enhance sustainability of visitor access to the park. In addition, the Park Service would continue to manage visitor use consistent with the preservation of natural and cultural resources. Although use could increase under alternatives B, C, and D if the demand exists, the formal program of indicators, standards, and adaptive management would minimize the potential for impacts on the long-term productivity of biotic communities—primarily wildlife populations.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments of resources are actions that result in a loss of resources that cannot be restored. An effect on a resource is irreversible if it (the resource) cannot be reclaimed, restored, or otherwise returned to its predisturbance condition.

With the exception of the consumption of fossil fuels for concession and park operations and maintenance, none of the alternatives would result in irreversible commitments of resources. The continued use of the Park Road under any alternative would have effects on resources such as wildlife. While the alternatives would not cause the loss of such resources, they would result in effects on wildlife and wilderness character that could not be reclaimed, restored, or otherwise returned to predisturbance conditions. For example, the presence of vehicles along the road and people at transportation nodes would continue to affect wildlife behavior, movement, and stress levels. Some individual animals would avoid the disturbance areas along the Park Road, while others would continue to become habituated to human presence.

Opportunities to experience solitude and the undeveloped nature of the wilderness at Denali would be affected primarily by the continued visual and noise disturbances associated with vehicle use along the Park Road, and from the concentrated human activity and imprints at the park's transportation nodes and the road itself.



Chapter 5
Consultation and Coordination

PUBLIC INVOLVEMENT

OVERVIEW

The plan / environmental impact statement represents the culmination of more than four years of concerted planning, analysis, and input provided by the NPS planning team, park staff, Native Alaskan groups, other government agencies, and the public. The process of consultation and coordination was vitally important throughout this planning project. The public participated in the development of this document by providing input at public meetings, responding to newsletters, and submitting comments by regular mail and electronically through the NPS planning website at http://parkplanning.nps.gov/dena/.

PUBLIC MEETINGS AND NEWSLETTERS

Public meetings and newsletters were used to inform the public of the plan and to involve them in the planning process. A mailing list was compiled of members of governmental agencies, Native Alaskan groups, organizations, legislators, local governments, and other interested citizens. Comments and suggestions offered by participants have provided NPS planners with important insights about what visitors, neighbors, officials, and others value about Denali National Park, their experiences traveling along the Park Road, and what NPS managers can or should do to improve visitor experiences while ensuring the protection of resources.

The notice of intent to prepare an environmental impact statement was published in the *Federal Register* on Tuesday, August 12, 2008 (Vol. 73, No. 156).

Public Scoping

During the summer of 2008, the Park Service issued a public newsletter announcing the plan / environmental impact statement. The newsletter identified the Park Service's intent to evaluate a range of alternatives for managing vehicles on the Park Road, and presented background information to support the decision to undertake the plan. The newsletter invited public comments, concerns, and suggestions to assist the planning team with specific regard to the following topics:

- Alternative approaches and ideas for accomplishing project goals.
- The range of environmental and socioeconomic issues that need to be considered.
- Other potential projects that might affect or be affected by the project.
- Information that needs to be considered (such as related research) and why it should be included.
- Information on how visitors and others use the park, and how the project might affect that use.
- Concerns about conditions or activities in the park related to the planning project, and suggestions for improvement.

The Park Service also held four public open house scoping meetings for this plan in September 2008. Meetings were held in Anchorage (September 3, 2008); Susitna Valley (September 4, 2008); Denali Park (September 10, 2008); and Fairbanks (September 11, 2008). The Park Service provided a brief presentation of the planning

project at each meeting. Approximately 58 people attended the meetings.

After the comment period closed, the Park Service issued a second newsletter during the fall of 2008 that summarized the comments and feedback provided by the public and park staff during the public scoping period. Comments were received on topics including type of vehicle, type of services, scheduling, vehicle numbers, information, reservations and booking, and interpretation.

Planning Workbook and Workshops

The *Denali Park Road Planning Workbook* provided background information and preliminary concepts for the plan / environmental impact statement. Public review of the workbook was held between January 1, 2010 and March 1, 2010. The public was invited to provide thoughts and suggestions by filling out a comment form or submitting comments online.

A series of public workshops was held in February 2010 to discuss the preliminary concepts, and to provide information on how the alternatives would be developed. Members of the public were invited to discuss the workbook and share their suggestions with park staff. The workshops were held in the park (February 11, 2010); Fairbanks (February 17, 2010); and Anchorage (February 18, 2010). Approximately 80 people attended these meetings. The following summarizes the comments received on the planning workbook.

Comments addressed proposed changes to management zoning and desired conditions, the proposed vision for the Denali Park Road transportation system, proposed goals and objectives, potential indicators, the current vehicle limit, the potential transportation system management concepts, new concept designs, potential management options for other vehicle use, access for daily NPS operations and West District required occupants, access for contractors, access to Teklanika River Campground, access for professional photography and commercial filming, access for the artists in residence program, access to Kantishna inholdings, and other miscellaneous topics.

Public Review of Draft Plan

The Notice of Availability for the draft plan / environmental impact statement was published in the Federal Register on August 1, 2011 (Vol. 76, No. 147). A series of public meetings were held in Denali Park (August 23, 2011); Fairbanks (August 31, 2011); and Anchorage (September 7, 2011). Approximately 61 people attended the meetings. Additionally, park staff were invited by stakeholder groups to discuss the draft plan at their regular meetings. Park staff attended and presented at approximately six stakeholder meetings.

The initial 60-day public comment period, August 1 through September 30, 2011, was extended to October 31, 2011 in response to numerous requests from the public and organizations. Comments on the draft plan were received by email, hard copy letter via mail, comment sheets submitted at the public meetings, or entered directly into the internet-based PEPC system. All comments received were entered into the PEPC system for analysis. Denali received 324 pieces of correspondence, containing 889 comments, during the 90-day comment period.

A preferred alternative was not identified in the draft plan to allow for refinement of the existing alternatives based on public input. The preferred alternative in the final plan addresses many of the comments and concerns that were received on the draft plan.

CONSULTATION WITH OTHER AGENCIES, OFFICIALS, AND ORGANIZATIONS

U.S. Fish and Wildlife Service, Section 7 Consultation

The Endangered Species Act of 1973, as amended, requires in section 7(a)(2) that each federal agency, in consultation with the secretary of the interior, ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. During the preparation of this plan, NPS staff coordinated informally with the U.S. Fish and Wildlife Service's Ecological Services office in Anchorage.

In accordance with the Endangered Species Act and relevant regulations at 50 CFR 402, the Park Service determined that actions proposed by this plan / environmental impact statement would have "no effect" on federal threatened or endangered species, as none are present in the park. A copy of the draft plan was sent to the Fish and Wildlife Service with a request for written concurrence with that determination.

In addition, the Park Service will continue to consult on future actions that may be conducted under the general framework described in this plan, and carried out as part of adaptive management strategies. Additional consultation will occur as necessary to ensure that future actions are not likely to adversely affect threatened or endangered species.

Section 106 Consultation

Agencies that have direct or indirect jurisdiction over historic properties are required by section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.), to take into account the effect of any undertaking on properties listed in or eligible for listing in the national register. The Denali Park Road was determined eligible for listing on the national register in 2009 as a historic structure, and the Alaska state historic preservation officer (SHPO) concurred with the determination. For the purposes of this vehicle management plan, the Park Service determined that actions proposed by the plan would not alter the road's character-defining features or the qualities that contribute to its national register eligibility. Other historic structures and districts along the road corridor were also determined not to be adversely affected by planning proposals. The topic of historic structures was therefore dismissed from analysis in this plan. Other cultural resource topics (archeological resources, ethnographic resources, cultural landscapes, and museum collections) were also dismissed from analysis because the anticipated adverse impacts on these resources from project actions were determined to be negligible to minor.

The Park Service sent a copy of the draft plan / environmental impact statement to the State of Alaska ANILCA Implementation Program and Office of History and Archaeology (state historic preservation office) for review and comment. Affiliated Native Alaskan representatives were also consulted, in fulfillment of section 106 requirements (see the "Consultation with Native Alaskans" section below).

Involvement of Other Federal and State Agencies, Regional and Local Governments, and Partner Organizations

Park staff meet on occasion with representatives of federal and state agencies and regional and local governments (as appropriate) on topics of mutual interest and concern, such as operating the park, preserving park resources, and making the park safe and enjoyable for visitors. The Park Service informed these groups of the draft plan / environmental impact statement and

indicated that discussion topics and planning issues were welcomed.

Consultation with Native Alaskans

Park staff communicated with local tribal groups regarding the plan. The planning alternatives were developed with consideration that project actions would avoid or minimally disturb resources or values important to affiliated Native Alaskan tribes. The planning alternatives do not entail new construction or ground disturbance, and are not anticipated to impede access to places of traditional religious, ceremonial, or other customary activities.

COMMENTS AND RESPONSES ON THE DRAFT PLAN / ENVIRONMENTAL IMPACT STATEMENT

This section summarizes the comments received following the release of the *Draft Denali Park Road Vehicle Management Plan and Environmental Impact Statement* (DEIS) on August 1, 2011. All written comments were considered during the preparation of the final plan and environmental impact statement (Final plan / EIS) in accordance with the requirements of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR 1503). All comments received during the public comment period have been considered by the planning team and NPS decision makers. They will be available for review on PEPC and the park's website (nps.gov/dena).

Denali National Park and Preserve received approximately 324 pieces of correspondence during the public comment period from August 1, 2011 through October 31, 2011. Correspondence was received by one of the following methods: email, hard copy letter via mail, comment sheet submitted at the public meetings, or entered directly into the Internet-based PEPC system. Letters received by email or through the postal mail, as well as the comments received from the public meetings, were entered into the PEPC system for analysis. Each of these letters or submissions is referred to as correspondence. A total of 889 comments were derived from the 324 pieces of correspondence received.

These comments were reviewed and classified as substantive or nonsubstantive. A substantive comment is defined in DO-12 as one that does one or more of the following (DO-12, section 4.6A):

- Question, with a reasonable basis, the accuracy of information presented in the EIS;
- Question, with reasonable basis, the adequacy of the environmental analysis;
- Present reasonable alternatives other than those presented in the EIS; and/or
- Cause changes or revisions in the proposal.

As further stated in DO-12, substantive comments "raise, debate, or question a point of fact or policy. Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive." While all comments were considered in the creation of the final plan / environmental impact statement, only those determined to be substantive were analyzed for response from the Park Service. However, the Park Service elected to respond to some nonsubstantive comments when they represented common questions, controversial elements, or misunderstandings among the public or other stakeholders.

Comments were grouped by similar themes, and summarized with an issue summary statement. Following each issue statement are one or more "representative quotes," which are comments taken directly from the correspondence to illustrate the issue, concern, or idea expressed by the comments grouped under that issue statement.

VEHICLE CAPACITY

Issue Summary Statement

Numerous respondents believed that in addition to managing for desired conditions, there needed to be a regulated maximum

vehicle capacity. Several comments expressed the desire to reduce the current levels of vehicle use, while others asked for an increase in vehicle use.

Representative Comments

"At present, we have a clearly stated capacity definition for the park road. If we are going to give it up, we want an equally clear capacity that can be readily understood by the public and readily compared to the existing capacity. Otherwise, NPS is going to find it has little legitimacy when it needs to enforce its standards, and the process could become mired in controversy."

"We believe a Fall-back Plan should be built into the New Vehicle Management Plan in case Adaptive Management proves unsuccessful or if the critical funding for the essential monitoring is cut to such a level to make the management plan unworkable."

"I believe there should have been an alternative that looked at the possibility of reducing the number of vehicles."

"Real alternatives would have presented different options for increasing vehicle traffic on the road."

Response

In response to public comment, the preferred alternative in the Final plan / EIS was developed to include a daily vehicle limit based on traffic modeling and nighttime traffic standards that had been used for analysis in the DEIS. This maximum daily level of 160 vehicles within a 24-hour period would not have specific allocations between daytime and nighttime vehicles, only that their respective standards would be met. If visitor demand should increase, management would take actions to reschedule or reduce other vehicle use of the road in order to meet visitor demand, while still complying with the standards and the daily maximum level. As proposed in the preferred alternative, counting all motorized vehicle use on the restricted section of the Park Road provides a more comprehensive look at the impacts of traffic on park resources and values.

In the extensive data collection that informed this planning effort, which included historical and current information, no data indicated the current volume of vehicle use on the Park Road was degrading park resources and values. Artificially limiting park access without supporting data does not meet the mission of the Park Service.

The proposed daily limit of 160 vehicles is less than the highest recorded daily vehicle count, but provides opportunity for an overall modest seasonal vehicle increase.

TRANSPORTATION SYSTEM: TRANSIT

Issue Summary Statement

Comments received on transit reflected a range from those who stressed its importance in providing basic and affordable access to a park experience to those who asked the agency to consider benefitting other user groups not using the transit system. Concern was also raised as to how "affordability" would be measured.

Comments also encouraged operating an efficiently run service that consistently would meet the needs of the transit rider.

Representative Comments

"We agree that visitors should have a least costly way to experience the park and for that method to receive priority within the concessioner-operated transportation system."

"We believe, unless market demand dictates otherwise, the total of Premium Long Tours should equal or exceed Transit buses due to the fact the volume of the Premium Tours

help keep the Transit service reasonably priced."

"We're not sure the draft plan's definition of affordability based on a visitor's "perceived value" is the best standard to use as there is no way of measuring potential visitors that didn't come due to the cost. We don't have a better definition to suggest, but rather encourage your efforts to continue to recognize the importance of welcoming all visitors, regardless of income level, by keeping transit prices as low as possible."

"Transit Service needs to be economically sustainable. At a minimum the service needs to pay for itself. The public will understand such a rate structure and not expect the concessioner to subsidize this service through higher tour pricing. A break-even Transit service would support lower tour pricing on average, making it more affordable."

"Though it is by no means perfect, the current transit system provides efficient access to backcountry users, and Alternative A is the only proposal where that access is coherently preserved."

"The name "Economy Tour" seems to cause some confusion so it may be less complicated to simply call it transit then advertise the option "to purchase self-guided tour materials" to enhance the trip. Additionally, day hikers may also want to purchase these materials."

Response

We acknowledge the sincerity of the differing points of view on "affordability." The Park Service will continue to manage the cost among the transportation services to ensure the transit service is as affordable as possible. Transit would continue to be prioritized in the transportation system so that park access is available to the widest range of park visitors.

The preferred alternative proposes operating the transit system similarly to how it is currently managed with transit service accommodating the needs of backcountry users, day hikers, campers, and visitors who choose to remain on the bus. The hiker wait time standard would be used to ensure an efficient system that provides reliable access into and out of the park.

There would be no distinct self-guided economy tour in the preferred alternative. However, self-guided tour materials would be available for all visitors.

TRANSPORTATION SYSTEM: PREMIUM TOURS

Issue Summary Statement

Many comments offered operational details for the premium tours. Some comments reflected concern on the impacts on existing facilities where tour volume may increase.

Representative Comments

"We support the expansion of the short tour to Teklanika as long as it is counted within the indicators and standards, or the 10,512 capacity limit if the No Action alternative is chosen. Visitor demand for the short tour is high and we believe expansion to Teklanika will improve the quality and visitor satisfaction over the current option. We are less supportive of expansion of the long tour to Eielson Visitor Center and unsure what visitors gain by this longer trip."

"Because the road width can accommodate non-yielding, two-way traffic and there is visitor dissatisfaction with the length of the current Denali Natural History Tour, Teklanika may be the preferred replacement destination."

"The plan claims that no infrastructure changes would be required for

implementation, yet alternatives suggest increased traffic to the Teklanika Rest Stop and perhaps to Eielson Visitor Center without an analysis of impacts."

Response

Operational and logistical comments received on the draft EIS will be considered in the operations plan for the transportation concessions contract.

Managing vehicle use to meet desired conditions for the specific zones along the Park Road allows park managers the flexibility to offer transportation services that meet changes in visitor interest and demand. Rather than tour destinations being restricted to a specific location, buses would be able to travel to different areas within a zone as long as standards are met for desired resource and visitor experience conditions. This is a fundamental change from the current condition and was described and modeled for the action alternatives.

The indicator set to measure crowding at rest areas (Teklanika, Toklat, and Eielson) has standards that reflect the facility capacity of each location. The draft EIS analyzed the impacts on these facilities based on the standards for desired condition. Any substantive changes to facilities along the Park Road (and the standards set to maintain desired conditions at those locations) would require additional NEPA compliance.

OTHER VEHICLE USE: ADMINISTRATIVE (NPS AND CONTRACTORS)

Issue Summary Statement

Some comments suggested that the Park Service be more conscientious of its own vehicle use on the Park Road and steps should be taken to reduce impacts from administrative use.

Representative Comments

"Park employees living at Toklat, Eielson, Wonder Lake, etc. should not be required to use a shuttle to access their work places. Their traffic has minimal impacts, compared to the buses, and this would be an additional hardship for employees traveling to and from their remote duty stations, especially with groceries and other supplies. I support requiring employee's guests to use the transit system, as they are coming to visit not just the employee, but the park."

"Walk the talk. I strongly support the increased oversight of NPS administrative use and contractors. There are many park employees who take vehicles to do tasks that could be accomplished by using the bus system, or some other means."

"I support the inclusion of construction vehicles in vehicle counts as it allows for a more accurate measure of traffic."

Response

The Park Service proposes to manage administrative use (including employee access to west end duty stations) within the 160-vehicle maximum daily limit. Contractor traffic would also be counted in the 160-vehicle daily limit and additionally managed to stay within the standards for nighttime and large vehicle traffic.

OTHER VEHICLE USE: PROFESSIONAL PHOTOGRAPHY

Issue Summary Statement

Many comments were received that favored a continuation of the professional photography program at its current level of permitted vehicle use along the length of the Park Road. Other comments supported the proposed restructuring of the program as described in the action alternatives, which would reduce

the number of daily permits in favor of the transportation system. Some respondents offered new alternative ideas for the program.

Additionally, one comment questioned if the program was being managed in accordance with federal law.

Representative Comments

"Any of the potential changes to the current program would dramatically affect a professional photographer's ability to get access to the park and would limit the photography available to the buyers' marketplace, including the ATIA, ACVB, State of Alaska, etc. NPS should think of the photographers as a valuable partnership, not unlike the railroads were in the 1920s."

"We recognize the opportunity the park provides for professional photographers and we support that opportunity after accommodations for road traffic by 1110(b) inholders, transit, tour, and NPS needs have been met."

"Please work to allow everyone access to the park, photographers and tourists alike, by not rescinding the photography road pass lottery. It seems like a very reasonable compromise to offer to give the photographers more passes in off seasons in return for using the high season passes for tourists."

"Please amend your plans to comply with the following federal law. It appears that the park is currently violation this law and said violation should cease. 16 USC Sec. 460l 6d 02/01/2010" (citation below)

(d) Protection of resources
The Secretary shall not permit any filming, still photography or other related activity if the Secretary determines—

(1) there is a likelihood of resource damage;

(2) there would be an unreasonable disruption of the public's use and enjoyment of the site; or

(3) that the activity poses health or safety risks to the public.

Response

The agency preferred alternative in the Final plan / EIS would combine professional photography and commercial filming programs to provide equity in permit distribution and gain efficiencies in administration and program oversight.

Up to five permits per day would be available for the entire road, as long as photographer vehicles do not displace buses or administrative traffic. Permits would be reduced as necessary to avoid displacement of visitor opportunities and administrative functions. Thus, while five permits could be available daily in the sought-after shoulder seasons, fewer permits may be available during the peak visitor period, which photographers commented was a less desirable time.

To consistently manage vehicle use on the Park Road, permits will include stipulations necessary to ensure standards for desired conditions are met (e.g., no more than one photographer vehicle at a wildlife stop, no parking in sheep crossing zones, and consideration of vehicles in the viewshed on the Park Road).

The professional photography and commercial filming programs are currently, and will continue to be, managed in accordance with applicable laws and policies. Accessing the restricted section of the Park Road in a private vehicle is an activity not available to the general public and, therefore, is an activity requiring a special use permit.

OTHER VEHICLE USE: TEKLANIKA RIVER CAMPGROUND

Issue Summary Statement

Comments on private vehicle access to Teklanika River Campground were generally in favor of continuing the current management plan to address the diverse needs of visitors.

Representative Comment

"Teklanika allows senior citizens, those with disabilities, and those with small children the opportunity to have an overnight experience in the heart of the park."

Response

The agency preferred alternative in the Final plan / EIS retains the ability for visitors to travel to the Teklanika River Campground in their personal vehicle for a minimum three-night stay. This travel may be shifted to periods of low traffic volume to meet desired conditions for natural resources and the visitor experience.

OTHER VEHICLE USE: ACCESS TO KANTISHNA INHOLDINGS

Issue Summary Statement

There was a range of comments regarding traffic to Kantishna inholdings. Some comments were strongly in favor of commercial day tours to Kantishna inholdings being operated under a commercial authorization, while others felt this access was allowed under ANILCA 1110(b). Other respondents asked for clarification of the plan's proposed action for all inholder access under ANILCA 1110(b). Finally, there were comments asking for clarification on the existing inholder allocation and how it would be dealt with in the Final plan / EIS.

Representative Comments

"Day tour buses provided by Kantishna inholders should be under commercial use authorizations and required to pay concession fees that will help maintain the park road and restrooms and other services used by such activities."

"DBL believes that it has a right to operate buses on the Park Road to conduct day trips to its in-holdings under ANILCA Subsection 1110(b)."

"The final document needs to avoid the implication that the Park may arbitrarily take away 'adequate and feasible access under Section 1110(b) to benefit recreational visitors."

"While the 1,360 number (inholder vehicle allocation set in regulation) has never been approached, it does provide some certainty in allocating traffic for other uses."

Response

Conducting commercial activity in the park outside the boundary of the inholding is not provided by ANILCA section 1110(b). Commercial use of park lands is regulated under federal law, which requires a commercial authorization. The preferred alternative proposes concession contracts for all commercial day tour activity to Kantishna.

The existing 1,360 seasonal vehicle allocation for private and overnight commercial inholder access to Kantishna will be retained. This access would be managed to meet standards and prioritized over all other vehicle use on the restricted section of the Park Road.

SCIENTIFIC ANALYSIS

Issue Summary Statement

The Park Service received several comments on the accuracy of the scientific methodology

and analysis used to judge impacts on the resource condition and visitor experience.

Representative Comments

"NPS has provided inadequate information as to whether the current capacity limit of 10,512 is not already creating degradation of park resources…"

"It seems that the Park Service cherry-picked data to support the sheep gap spacing. This issue is important because ensuring the sheep gap times would require strict scheduling that might have no benefit for sheep, but could easily inconvenience everyone travelling the road."

"While NPS repeatedly points to "potential impacts" to wildlife from each of the three Alternatives (A, B, & C) it does not deal with reducing those impacts but instead only suggests how it will monitor and try to mitigate those impacts. There is no long-term tracking data of Denali wildlife populations for Dall sheep, caribou, grizzly bear, gray wolf, moose and other wildlife provided in the DEIS as a basis of evaluating impacts."

"I question the accuracy of using a photograph as a means of assessing visitor experience to actual bus density in the real world, on the ground."

"Park visitation has not gone up dramatically. The EIS only shows visitation back to 2005. That limited data is misleading."

Response

The Park Service conducted statistically sound and peer-reviewed studies to assess the impacts of traffic on the behavior and distribution of wildlife. The preferred alternative proposes a comprehensive monitoring process that employs adaptive management to adjust traffic behavior if a negative impact is detected.

Dall sheep are a fundamental resource of the park. They are a species that shows sensitivity to disruption of migration patterns. Park studies have documented impacts on Dall sheep from road traffic. The loss of traditional migration routes on the more heavily trafficked paved road section east of Savage River demonstrates the need for a proactive approach. The 10-minute sheep gap spacing offers the best balance between the need to not disrupt the migratory pattern of the less-habituated sheep groups with the desire to not unnecessarily restrict traffic and thus displace visitors.

The Park Road Study (2006 – current) and the historical research data used to inform the draft EIS give no indication of a degraded resource condition west of Savage River. Because of this, the condition under the current management plan became the baseline for comparison and development of the draft EIS. The preferred alternative commits to managing vehicle use to the baseline condition, or better, in terms of crowding along the road. Additional information and peer-reviewed wildlife studies are available on the park's website (nps.gov/dena).

The methodology used to gauge visitor perception is commonly accepted in social science studies. Visitor surveys conducted as part of the road study were used to identify indicators. The survey results, in concert with existing conditions and other information, informed the development of the standards. Standards were selected that would maintain or improve current conditions.

The trends in park visitation reflect trends in visitation to the state of Alaska. The five-year time frame considered in the draft EIS reflects the historic highs and lows that have occurred due to economic changes. The new approach to vehicle management employs a more proactive, scientifically defensible method that responds to changes in resource condition and visitation.

INDICATORS AND STANDARDS

Issue Summary Statement

Several comments were received that expressed concern over the selection of an indicator, or associated standards.

Representative Comments

"In short, data do not support the assumption that road traffic actually has an adverse effect of sheep or that 10 minute gaps in traffic every hour will facilitate sheep crossings."

"According to the draft, '. . . there is no strong evidence of mechanistic relationships between . . . traffic volumes or patterns and wildlife distribution or movements that would lead to clear indicators and standards.' Hints of negative relationships, however, warrant caution (DDVMP, page 23). Hence, the two natural resource indicators and or their standards that were developed do not seem as strong as one would hope."

"In addition to hiker wait time, there should be a "Departure Wait Time" standard."

Response

The chosen indicators reflect the desired conditions, are easily quantified, and are feasible for long-term monitoring. These indicators address issues of significant management concern, such as the preservation of wildlife viewing opportunities and quality of the visitor experience.

The Park Service considered a departure wait time indicator. It was not chosen because the hiker wait time indicator is a more effective measure, and the proposed reservation system ensures reasonable and timely access to the transit system.

The Park Service agrees that the indicators alone do not address all potential wildlife concerns. Therefore, the Park Service developed a comprehensive monitoring plan to supplement the indicators and standards (see appendix C).

COST OF PLAN IMPLEMENTATION

Issue Summary Statement

A number of comments expressed concern over the cost of implementing a vehicle management plan that uses comprehensive monitoring and adaptive management.

Representative Comment

"Concepts B &C require so much equipment, monitoring, micro-monitoring that it will create layers of management and increase potential annual operating costs of Park operations by $1 million or more over current levels each year."

Response

Based on public concern about the cost of plan implementation, the Park Service took the following four steps: 1. revised the cost analysis to reflect the reduced costs for minimum plan implementation; 2. included historical monitoring costs for alternative A; 3. reformatted the analysis for clarity; and 4. documented the assumptions used in the cost analysis (see appendix B).

The initial cost analysis in the draft EIS included desired changes to the future concession contract that are not part of the minimum costs necessary for implementing the alternatives. The current version in the Final plan / EIS reflects a minimal approach and associated costs required to implement the plan, which are now, for clarity, described as annual costs.

MANAGEMENT WITHIN EXISTING REGULATIONS

Issue Summary Statement

Comments were received that questioned whether the Park Service was in compliance with the current regulation of the 10,512-vehicle seasonal limit.

Representative Comments

"Furthermore, the current system should account for all of those DNHT tours that travel past Savage. NPS is currently breaking the regulation it created itself. DNHT and contractor vehicles are on the park road and are not counted? Who decided that was OK?"

Response

The preferred alternative directly responds to the concern of need for greater transparency by including all vehicle use west of the Savage River Check Station in the daily limit. Current vehicle use on the Park Road is compliant with amendments made in the general management plan in the 1997 *Entrance Area and Road Corridor Development Concept Plan*.

PLANNING PROCESS

Issue Summary Statement

The Park Service received several comments regarding how public input was used in formulating the draft EIS.

Representative Comment

"I could find no place where you modified your proposals from the first round of public comments taken last year."

Response

The vehicle management plan started with public scoping in 2009. Comments were received at public meetings and via electronic and postal mail. Based on the range of ideas suggested in scoping, a workbook of four different concepts was distributed for public comment in 2010. The public's response modified the four workbook concepts into the three action alternatives for the draft EIS. The draft EIS was distributed for an extended public review and comment period in 2011. The comments received on the draft EIS substantially informed the development of the agency preferred alternative for the Final plan / EIS.

PUBLIC PROCESS FOR VEHICLE MANAGEMENT

Issue Summary Statement

Several comments asked the Park Service to allow stakeholder input in the decision-making process for future issues regarding vehicle management on the Park Road.

Representative Comments

"We recommend the creation of a Transportation System Advisory Council or Committee made up of a wide range of stakeholders, including but not limited to a range of tourism representatives representing multiple segments of travel."

"Keep the current system and form a committee that represents the various stakeholders (like the Denali Park Overflights Committee) to examine and change the systems when/if needed."

"Major decisions about road capacity could be made through a much less stringent (and more frequently amended) procedure than a NEPA process requires, and would require a much heavier burden on concerned citizens

and organizations who would like to provide input on these management decisions."

Response

The Park Service is always open to constructive input from the public. The Park Service valued the input by a wide range of stakeholders on the development of the vehicle management plan. Prior to making any substantive changes to the plan, the Park Service is required to comply with the National Environmental Policy Act and other federal laws. It is through these processes that we solicit input from the public.

PLAN IMPLEMENTATION

Issue Summary Statement

The Park Service received several comments regarding plan implementation, specifically the timing of any changes to the services offered in the transportation system and the consideration of a third-party reservation system.

Representative Comments

"The Visitor Industry must plan ahead at least two years prior to operating in any given year and a certain level of volume and predictability is required. It would be extremely difficult and cause serve[sic] disadvantages to the entire Alaska Travel Industry if dramatic changes are made with less than a two year warning."

"We highly recommend NPS separate bus reservations from bus operations. We suggest the reservation function (for both tour and transit) goes to a separate company that is paid a flat fee for providing this service. Creating a neutral third party and removing the financial incentive to sell higher priced tickets, will improve the likelihood that visitors receive thorough information and purchase the bus best suited to their needs."

Response

The Final plan / EIS reflects a two-year advanced notice for any significant changes that affect the capacity of the transportation system. Minor changes could be made on a daily basis (similar current management practices) to keep the transportation system within standard.

The concept of separating the transportation system operations from the reservation system is currently being analyzed as part of the prospectus development for the next concession contract.

SAFETY

Issue Summary Statement

Several comments were received that expressed safety concerns in allowing more vehicles and buses on the road.

Representative Comments

"It appears that even though the number of vehicles may be the same or decreased that there would be more buses on the road form Eielson to Wonder Lake. The road from mile 80-84 is the most dangerous part of the park road with the highest number of accidents. It is also the stretch of road in the worst condition. If we add more buses for that duration of the road corridor, there will be a decrease in safety."

"The road between Savage River and Teklanika (Wildlife Viewing Subzone 1) is one of the most dangerous sections of road in the whole 92 miles. It is very slippery and sloppy when wet which is frequently in the summer season. It has also been narrowed in many spots and has many steep, straight down, drop offs where a bus or private vehicle could roll. Do NOT for safety's sake increase the number of vehicles or the width or length of vehicles on this stretch of road."

"Safety should take priority over managing for a "primitive road experience". An extra 6-10 feet of road width around a narrow curve will not be viewed as "less wild" or "less primitive" by park visitors."

Response

The Park Service agrees that safety is the primary consideration for all aspects of managing vehicle use on the Park Road.

AGENCIES, ORGANIZATIONS, AND OTHER ENTITIES RECEIVING A COPY OF THIS DOCUMENT

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Environmental Protection Agency, EPA Region 10

U.S. Army Corps of Engineers, Regulatory Branch

U.S. Department of the Interior, Office of Environmental Policy and Compliance

U.S. Fish and Wildlife Service, Ecological Services, Anchorage

STATE OF ALASKA

Alaska Department of Natural Resources, Office of History and Archaeology

NATIVE ALASKAN TRIBES

Nikolai

Cantwell

Lake Minchumina

Tanana

Telida

NATIVE CORPORATIONS

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ALASKA CONGRESSIONAL DELEGATION

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- Senator Lisa Murkowski
- Senator Mark Begich

U.S. House of Representatives
- Congressman Don Young

ORGANIZATIONS/BUSINESSES

Alaska Geographic

Alaska Quiet Rights Coalition

Alaska Rainforest Campaign

Citizen's Advisory Commission on Federal Areas

National Wildlife Federation

Talkeetna Times

The Wilderness Society

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Wildlife Conservation Society

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APPENDIX A: ANILCA 810(A) ANALYSIS

SUBSISTENCE - SECTION 810(a) OF ANILCA SUMMARY EVALUATION AND FINDINGS

I. INTRODUCTION

This section was prepared to comply with title VIII, section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It summarizes the evaluation of potential restrictions to subsistence that could result from the Denali National Park Vehicle Management Plan (plan).

II. THE EVALUATION PROCESS

Section 810(a) of ANILCA states:

> "In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be affected until the head of such Federal agency -
>
> (1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805;
>
> (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and
>
> (3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

ANILCA created new units and additions to existing national park system units in Alaska. Denali National Park and Preserve was created by ANILCA section 202(3)(a):

> "The park additions and preserve shall be managed for the following purposes, among others: To protect and interpret the entire mountain massif, and additional scenic mountain peaks and formations; and to protect habitat for, and populations of, fish and wildlife, including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans and other waterfowl; and to provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities."

Title I of ANILCA established national parks for the following purposes:

> "... to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting, within large arctic and subarctic wildlands and on free-flowing rivers; and to maintain opportunities for scientific research and undisturbed ecosystems."

> "... consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for which each conservation system unit is established, designated, or expanded by or pursuant to this Act, to provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so."

The potential for significant restriction must be evaluated for the proposed action's effect upon "... subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use ..." (section 810(a)).

III. PROPOSED ACTION ON FEDERAL LANDS

The plan proposes four alternatives. Alternative A is the no-action alternative. Alternative B proposes to optimize access to the park by prebooking and filling buses. Alternative C proposes to maximize visitor opportunities by offering a wider range of access choices. Alternative D is the preferred alternative and would offer visitors the opportunity to have a high-quality experience using a transportation system that offers predictability, efficiency, and a variety of experiences. All alternatives are described in detail in the environmental impact statement and all alternatives provide a range of tools to manage vehicular traffic on the Denali Park Road. Customary and traditional subsistence use on NPS lands will continue as authorized by federal law and regulations under all alternatives.

IV. AFFECTED ENVIRONMENT

Subsistence uses within Denali National Park and Preserve are permitted in accordance with ANILCA. Section 202(3)(a) of ANILCA allows local residents to engage in subsistence uses in the ANILCA additions to the park where such uses are traditional in accordance with the provisions in title VIII. Lands within former Mount McKinley National Park are closed to subsistence uses.

A regional population of approximately 300 eligible local rural residents qualifies for subsistence use of park resources. Resident zone communities for Denali National Park and Preserve are Cantwell, Minchumina, Nikolai, and Telida. By virtue of their residence, local rural residents of these communities are eligible to pursue subsistence activities in the new park additions. Local rural residents who do not live in the designated resident zone communities, but who have customarily

and traditionally engaged in subsistence activities within the park additions, may continue to do so pursuant to a subsistence permit issued by the park superintendent.

The Park Service realizes that Denali National Park and Preserve may be especially important to certain communities and households in the area for subsistence purposes. The resident zone communities of Minchumina (population 22) and Telida (population 11) use park and preserve lands for trapping and occasional moose hunting along area rivers. Nikolai (population 122) is a growing community and has used park resources in the past. Cantwell (population 147) is the largest resident zone community for Denali National Park and Preserve, and local residents hunt moose and caribou, trap, and harvest firewood and other subsistence resources in the new park area.

The main subsistence species, by edible weight, are moose, caribou, furbearers, and fish. Varieties of subsistence fish include coho, king, pink, and sockeye salmon. Burbot, dolly varden, grayling, lake trout, northern pike, rainbow trout, and whitefish are also among the variety of fish used by local people. Beaver, coyote, land otter, weasel, lynx, marten, mink, muskrat, red fox, wolf, and wolverine are important furbearer resources. Rock and willow ptarmigan, grouse, ducks, and geese are important subsistence wildlife resources.

The National Park Service recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in any given year many vary considerably from previous years because of such factors as weather, migration patterns, and natural population cycles. However, the pattern is assumed to be generally applicable to harvests in recent years with variations of reasonable magnitude.

V. SUBSISTENCE USES AND NEEDS EVALUATION

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources that could be impacted.

The evaluation criteria are:

- the potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers, (b) redistribution of subsistence resources, or (c) habitat losses;
- the effect the action might have on subsistence fishing or hunting access; and
- the potential to increase fishing or hunting competition for subsistence resources.

The Potential to Reduce Populations

Provisions of ANILCA and federal and state regulations provide protection for fish and wildlife populations within Denali National Park and Preserve.

Any changes in traffic patterns on the road will be prefaced by a monitoring plan outlined in this plan / environmental impact statement. Impacts on wildlife are not anticipated; however, the Before-After Control Impact (BACI) monitoring program will be in place to ensure impacts are identified quickly and remedied. The alternatives would not adversely affect the distribution or migration patterns of

subsistence resources. Therefore, no change in the availability of subsistence resources is anticipated as a result of the implementation of the preferred alternative.

Restriction of Access

Denali National Park and Preserve is managed according to federal legislative mandates, NPS regulations, NPS management policies, and the park's general management plan.

Alternative A (No Action), the status quo, would not significantly limit or restrict access to subsistence resources in Denali National Park and Preserve.

Alternative B (Optimizing Access) will not change, limit, or restrict the access of subsistence users to natural resources within the ANILCA additions of Denali National Park or Denali National Preserve. Federal and nonconflicting state regulations assure the continued viability of fish and wildlife populations.

Alternative C (Maximizing Visitor Opportunities) will not change, limit, or restrict the access of subsistence users to natural resources within the ANILCA additions of Denali National Park or Denali National Preserve. Federal and nonconflicting state regulations assure the continued viability of fish and wildlife populations.

Alternative D (Preferred Alternative) would not change, limit, or restrict the access of subsistence users to natural resources within the ANILCA of Denali National Park or Denali National Preserve. Federal and nonconflicting state regulations assure the continued viability of fish and wildlife populations.

Increase in Competition

Alternative A (No Action) maintains the status quo and would not result in increased competition for fish, wildlife, or other resources that would significantly impact subsistence users in Denali National Park and Preserve.

Alternative B (Optimizing Access) would not result in increased competition for fish, wildlife, or other resources that would significantly impact subsistence users in Denali National Park and Preserve. Federal and nonconflicting state regulations assure the continued viability of particular fish or wildlife populations. If it is necessary to restrict the taking of fish and wildlife to assure the continued viability of a fish or wildlife population or the continuation of subsistence uses of such population, subsistence uses are given a priority over other consumptive uses.

Alternative C (Maximizing Visitor Opportunities) would not result in increased competition for fish, wildlife, or other resources that would significantly impact subsistence users in Denali National Park and Preserve. Federal and nonconflicting state regulations assure the continued viability of particular fish or wildlife populations. If it is necessary to restrict the taking of fish and wildlife to assure the continued viability of a fish or wildlife population or the continuation of subsistence uses of such population, subsistence uses are given a priority over other consumptive uses.

Alternative D (Preferred Alternative) would not result in increased competition for fish, wildlife, or other resources that would significantly impact subsistence users in Denali National Park and Preserve. Federal and nonconflicting state regulations assure the continued viability of particular fish or wildlife populations. If it is necessary to restrict the taking of fish and wildlife to assure the continued viability of a fish or wildlife population or the continuation of subsistence uses of such population, subsistence uses are given a priority over other consumptive uses.

If, and when, it is necessary to restrict taking, subsistence uses are the priority consumptive users on public lands of Alaska and will be given preference on such lands over other consumptive uses (ANILCA, section 802(2)).

Continued implementation of provisions of ANILCA should mitigate any increased competition, however significant, from resource users other than subsistence users. Therefore, the preferred alternative is not expected to adversely affect resource competition.

VI. AVAILABILITY OF OTHER LANDS

Choosing a different alternative would not decrease the impacts on park resources for subsistence. The preferred alternative is consistent with the mandates of ANILCA, including title VIII, and the NPS Organic Act.

VII. ALTERNATIVES CONSIDERED

The alternatives considered for this project were limited to the lands along the Park Road. The alternatives are A) continue the existing conditions (no action); B) optimizing access; C) maximizing visitor opportunities; and D) preferred alternative. None of the alternatives propose changes to the road or any lands.

VIII. FINDINGS

This analysis concludes that the action alternatives would not result in a significant restriction of subsistence uses.

APPENDIX B: ESTIMATED COSTS FOR VEHICLE MANAGEMENT PLAN ALTERNATIVES

This table presents a summary of the potential cost estimates for implementation of the *Denali Park and Preserve Vehicle Management Plan / Environmental Impact Statement*. The costs are presented as estimates and are not appropriate for budgeting purposes.

	Alternative A[2]	Alternative B	Alternative C	Alternative D
NPS Expenditures[1]				
Monitoring Staff	$200,000	$200,000	$200,000	$200,000
Monitoring Equipment	$50,000	$60,000	$60,000	$60,000
GPS Software	$22,000	$22,000	$22,000	$22,000
Concession Management	$250,000	$250,000	$250,000	$250,000
Road Operations and Maintenance[3]	$3,000,000	$3,000,000	$3,000,000	$3,000,000
GPS System Yearly Costs to Concessioner		$60,000	$60,000	$60,000
BACI Costs		$600,000[4]	$600,000[4]	$200,000[5]
TOTAL:	**$3,522,000**	**$3,622,000**	**$3,622,000**	**$3,602,000**
Expenditures from Other Sources[6]				
GPS System Initial Costs	$350,000	$350,000	$350,000	$350,000
Other Sources TOTAL:	**$350,000**	**$350,000**	**$350,000**	**$350,000**

[1] Annual costs are shown. All alternatives do not include costs for improved performance (e.g., interpretation oversight, fiscal accountability, and new bus designs) desired in new concessions contracts that would occur regardless of alternatives chosen in the plan / environmental impact statement. Costs are at 2012 dollar values and visitation levels are assumed to be the same across all alternatives.

[2] Alternative A costs represent the average of the previous four years.

[3] The Park Service does not anticipate any significant increase or decrease in road maintenance and operational costs because there is no appreciable change in traffic levels between the alternatives.

[4] Three BACI studies averaged over 20 years of the plan.

[5] The one-time costs of the 2016 BACI study will be $200,000, averaged over 20 years of the plan. Thus, $10,000 per year has been added to the annual NPS total. Subsequent BACI studies will be part of a separate NEPA process and, therefore, are not part of this calculation.

[6] Federal Highway Administration funding will be used to purchase new GPS units prior to the Record of Decision on this plan / environmental impact statement. Therefore, this one-time cost has been included in this table to illustrate that the new GPS system would be implemented under all scenarios.

APPENDIX C: ADAPTIVE MANAGEMENT AND MONITORING STRATEGY FOR THE VEHICLE MANAGEMENT PLAN AND EIS

APPENDIX C:

[redacted]

National Park Service
U.S. Department of the Interior

Denali National Park and Preserve
Alaska

Adaptive Management and Monitoring Strategy for the Vehicle Management Plan and EIS



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Introduction

The goal of the adaptive management strategy for the Denali Park Road Vehicle Management Plan is to protect the exceptional condition of the park's resources and values and to preserve the high quality visitor experience through informed, proactive and transparent management. There are two objectives associated with this goal that relate to management of natural resources: 1) manage the transportation system to ensure protection of wildlife populations, wildlife habitat, and the processes and components of the park's natural ecosystem, and 2) manage the transportation system to ensure protection of wilderness character, wilderness resource values, and wilderness recreational opportunities.

Adaptive management is a process that promotes an experimental approach to management and flexible decision making that can be adjusted as results of management actions are monitored and better understood (Prato 2008). We need adaptive management because the outcomes of most management actions are shrouded in uncertainty and unpredictability due to environmental variability or incomplete knowledge of system dynamics. The action alternatives in the Vehicle Management Plan and Environmental Impact Statement require that an adaptive management strategy be implemented and monitoring studies conducted. The strategy outlined here is designed to detect changes to important resource conditions that may be caused by changing the transportation system on the park road and to provide park managers with a method to adaptively manage traffic to address any effects. The value of an adaptive management strategy to assess resource impacts on the park road is that the expected performance of the managed system may be greatly improved by reducing uncertainty about possible effects on resources. The prospect of substantially improving decision making justifies the cost of monitoring and assessment.

Since 2006, Denali National Park and Preserve has been conducting a series of scientific studies to better understand the relationships between traffic patterns on the park road and the physical, biological and social environment. Collectively called the Road Capacity Study, the purpose has been to provide scientific support for park road traffic levels that would not impede wildlife populations along the park road corridor (Phillips et al. 2010) and would maintain visitor satisfaction (Manning and Hallo 2010). These studies have lead to the development of a four tiered approach to the adaptive management strategy. The first tier includes a set of indicators with quantitative standards associated with them designed primarily to regulate the numbers of vehicles on the park road in such a way that natural resources are protected and the visitor experience is preserved. The other tiers, described in more detail below, are designed to

ensure that the chosen indicators and standards are protecting natural resources and preserving the visitor experience. If results from tiers two, three or four suggest that there are changing conditions for natural resources or the visitor experience attributable to the amount of vehicles on the park road, adaptive management actions may include a range of options from adjusting traffic schedules and vehicle numbers to a return to the previous traffic system. If monitoring detects impacts to the high priority indicators of fundamental park resources, managers may respond with either adjustments to the schedule or a decrease in traffic levels.

An additional part of the Road Capacity Study involved equipping all concessioner buses and many other vehicles traveling the park road with GPS units to collect detailed information on their movement. From these data, a micro-simulation model was developed that would enable the park to test how different schedules may meet the standards set for the indicators (Morris et al. 2010). Any proposed traffic volume or schedule would be first tested in this model and adjusted such that, based on simulations, it appears to meet the standards. Upon implementation of a new traffic volume and schedule, monitoring would be conducted as described below to ensure that the standards are being met. An adaptive management approach would be taken with the initiation of any of the action alternatives involving comprehensive monitoring programs for both resource condition and visitor satisfaction to ensure no degradation in these areas (Fig. 1).

Given the inherent uncertainty in this system, implementation of action alternatives B and C is proposed to be done in phases, building up to the full increase in traffic volume suggested possible by the simulation model. Of the full increase over current levels considered possible, only a portion of that difference in traffic volumes would be realized at any one time, and the impacts monitored and analyzed before additional increases are attempted. Each phase would last at least 2 years to fully understand the impacts of increased traffic to natural resources and visitor experience. For the Preferred Alternative D, the uncertainty in the system would be addressed through a maximum daily vehicle limit, eliminating the need for incremental increases and phases.

A number of social and wildlife parameters will be monitored as part of this strategy. Because natural resource systems operate at multiple temporal and spatial scales and involve interactions among many component systems, the strategies for monitoring and management response actions for indicators will vary. As mentioned above, there are currently four tiers of resource and visitor experience parameters that will be evaluated as part of this process (Table 1). Figure 1 depicts how these parameters fit into the

proposed adaptive management strategy for traffic patterns and volume on the park road.

Overview of four tiers of resource and visitor experience parameters

Tier 1

The first tier includes indicators with specified standards which are associated with traffic levels and traffic patterns on the park road. These indicators and their associated standards will initially limit traffic volumes on the park road, though further limitations may result from the higher-tiered parameters. Monitoring tools will allow resource managers to summarize and assess these indicators frequently (multiple times a season) to adjust traffic levels or schedules in a timely fashion, primarily between seasons but with some ability to respond within a season. Predictive modeling will allow for more informed analysis of potential impacts to these indicators prior to implementation of any transportation changes, so the uncertainty associated with these indicators is relatively low. These indicators include crowding standards for the number of vehicles at wildlife stops, in a viewscape, and at a rest area; the spacing of vehicles to ensure time for sheep crossings, restrictions to night-time traffic volumes, and restrictions to large (construction-related) vehicle traffic. A seventh indicator, amount of time hikers wait along the road for pick-up by a bus, will not impact vehicle numbers specifically but will define the allocation between tour and transit buses.

Tier 2

Second tier parameters assess natural resource/wilderness conditions, and visitor satisfaction that will be monitored long term specifically to address the impacts of traffic on important resources and visitor experience. These are monitoring programs that are not part of the NPS Inventory and Monitoring program but rather are conducted specifically for wildlife along the road corridor and for monitoring visitor satisfaction. Monitoring would occur at intervals appropriate to the scale of the information collected (generally every 1 – 5 years). Data collected may need to be synthesized with additional information (i.e. tier 3 and 4 parameters) to make conclusions about the source of impacts. Tier 2 parameters include the distribution and number of wildlife sightings of large mammals along the road and visitor satisfaction with factors such as vehicle crowding levels and wildlife sightings.

Tier 3

Third tier parameters will be evaluated using an experimental design. A Before-After, Control-Impact (BACI) study design will be employed which is based on the principle that if two locations (control and impact) are monitored before and after a human-caused disturbance (in this case an experimental change in the transportation system) the impact location may show a different pattern after the disturbance than the control site (Underwood 1994, Smith 2002). BACI studies measure the change in the differences among sites between the two time periods (before and after impact) rather than only measuring the overall magnitude of difference between the sites, thereby controlling for differences unrelated to the impact of interest. Consequently, park managers can attribute resource impacts to the management action if after the action, the magnitude of these difference values changes significantly from the observations before the action. Indicators evaluated using this experimental design will be assessed using discrete studies that will be implemented before and after any change in the transportation system and each will be of limited time duration. These parameters will not be subject to long term monitoring. Indicators include movement rates of grizzly bears and Dall sheep when crossing the park road, the distribution of bear inactive periods relative to the road, and the probability and timing of sheep crossings.

Tier 4

Fourth tier parameters are those resources already being monitored by long-term inventory and monitoring programs that may help evaluate trends observed in tier 1-3 indicators and parameters. By following trends seen in wildlife populations monitored throughout the park, managers should be able to better tease apart traffic impacts from other possible factors affecting populations. Parameters include long-term monitoring of wolves, caribou, moose and Dall sheep population numbers and distribution, wildlife-visitor incident records and distribution and number of breeding birds.

Additional studies may be implemented to address the potential confounding effects of climate change. It may be necessary to conduct research or other information gathering to be able to separate the impacts of climate change or other large-scale directional changes from those associated with the transportation plan.

Table 1. Indicators and other metrics being considered to limit vehicles on the Denali Park Road and to monitor natural resource condition following the implementation of the Vehicle Management Plan. A Before-After-Control-Impact study is planned whereby data collected before implementation will be compared to data collected after implementation to ensure that there are no significant changes. Some data would be collected every year (annual frequency) while other data would be collected less frequently. Data are divided into Tiers that describe their source, frequency of collection and how they are used in evaluating the natural resource condition.

TIER 1: indicators with specific mechanistic links and standards associated with traffic levels and scheduling on the park road

Indicator	Description
Sheep gap spacing	Provide gaps in traffic (periods of no traffic) to occur each hour for a minimum duration of time at critical sheep migration corridors.
Night-time traffic	Manage the amount of traffic allowed to travel the road at night to minimize impacts on day-time wildlife sightings.
Number of vehicles at a wildlife stop	Manage the number of vehicles at wildlife stops primarily through traffic volume and scheduling, incorporate driver behavior secondarily.
Number of vehicles in a viewscape	Manage the number of vehicles visible in iconic viewscapes through traffic volume and scheduling.
Number of vehicles at rest stops	Manage the number of vehicles at rest stops based on the design standards and capacity of the individual facilities.
Hiker wait time	Maintain a minimum wait time for hikers along the road to be picked up by a bus by providing adequate transit service.

TIER 2: natural resource and wilderness conditions that will be monitored long term specifically to address the impacts of traffic

on important resources	
Metric	Description of data collection
% chance of seeing a grizzly bear on road trip	Data collected by bus drivers using SLCD panels from 2007 – current. Written observation data collected by bus drivers from 1996-2007. From 2010 to current, focused effort by park staff to ride buses and collect wildlife observation data.
% chance of seeing "big 5" on road trip	Data collected by bus drivers using SLCD panels from 2007 – current. Written observation data collected by bus drivers from 1996-2007. From 2010 to current, focused effort by park staff to ride buses and collect wildlife observation data.
Distribution of wildlife sightings (spatially and temporally)	Data collected by bus drivers using SLCD panels from 2007 – current. Written observation data collected by bus drivers from 1996-2007. From 2010 to current, focused effort by park staff to ride buses and collect wildlife observation data.
Visitor Satisfaction	The VSP tool would be used to ensure continued high levels of satisfaction. It would be implemented along with the post-impact BACI study and would continue to be conducted every 2-4 years.

TIER 3: parameters that will be evaluated using a Before-After, Control-Impact (BACI) experimental design.

Metric	'Before' Data	Proposed 'After' Data
Timing and location of Dall sheep and grizzly bear crossings (remote)	GPS collaring studies conducted in 2006 (grizzly bears) and 2007 (Dall sheep). Draft reports are available.	GPS collaring studies will be repeated once the Vehicle Management Plan and new Concession Contract/s are initiated
Timing and location of Dall sheep and grizzly bear crossings (by	Road study staff observations and, from 2010 to current, focused effort by park staff to ride	Road study staff observations and, from 2010 to current, focused effort by park staff to ride buses

observation)	buses and collect wildlife observation data.	and collect wildlife observation data.
Movement rate of bears and sheep when crossing or "near" park road	GPS collaring studies conducted in 2006 (grizzly bears) and 2007 (Dall sheep). Draft reports are available.	GPS collaring studies will be repeated after the Vehicle Management Plan and new Concession Contract/s are initiated
Distribution of bear inactive periods relative to road	GPS collaring studies conducted in 2006 (grizzly bears) and 2007 (Dall sheep). Draft reports are available.	GPS collaring studies will be repeated after the Vehicle Management Plan and new Concession Contract/s are initiated
Probability and timing of sheep crossings	GPS collaring studies conducted in 2006 (grizzly bears) and 2007 (Dall sheep). Draft reports are available.	GPS collaring studies will be repeated after the Vehicle Management Plan and new Concession Contract/s are initiated
Distribution of bears and sheep	GPS collaring studies conducted in 2006 (grizzly bears) and 2007 (Dall sheep). Draft reports are available.	GPS collaring studies will be repeated after the Vehicle Management Plan and new Concession Contract/s are initiated

TIER 4: data collection for resources already being monitored by long-term inventory and monitoring programs

Metric	Description of data collection
Monitoring for population size and demographic parameters for:	
Dall sheep	Prior to 2008, sheep censuses in Denali were irregular and composed primarily of ground surveys obtaining information on age and sex composition as well as population size. These data collection efforts were supplemented with infrequent aerial surveys. Since 2008, the Central Alaska Network has been developing and implementing standardized methods for aerial sheep surveys that will rotate among Denali, Wrangell - St. Elias National Park and Preserve and Yukon – Charley Rivers

	National Preserve (NPS 2009).
Wolves	At least one wolf in each pack of wolves within Denali National Park and Preserve is kept either radio- or GPS/ARGOS collared and the pack's locations and sizes are monitored multiple times throughout the year. Annual population counts are estimated through these data to monitor the population (Meier 2009). In 2011, additional collars were placed on wolves within each pack to provide more detailed information on survival and movements for different age classes. This collaring may be continued.
Caribou	Denali Caribou Herd censuses occur annually for population size, calf production, calf recruitment, adult female survival, herd composition and herd location and distribution. Since 1986, approximately 50 adult female caribou within the herd have carried radio collars to assist in the collection of these data (Adams and Roffler 2009). Since 2007, approximately 50 adult male caribou from the Denali herd have been radio-collared and located periodically throughout the year. In addition, the implementation of 20 GPS collars on Denali caribou from 2010 – 2013 will provide more fine-scale data on caribou distribution and movements.
Moose	Aerial population census surveys for moose are conducted in Denali approximately every 3 years. The most recent survey, conducted in 2008, suggested a population size of 1279 moose in the survey area on the north side of the range (Owen and Meier 2009). Because moose surveys depend on snow cover and are conducted in early winter, they do not provide information on moose distribution during the season when the park road is open.

Figure 1. Flow chart depicting the adaptive management strategy proposed by Denali to manage traffic patterns and volumes along the park road. A set of five indicators and standards will initially limit traffic along the park road (purple boxes). No degradation of natural resource condition (blue and peach boxes) or visitor experience (yellow boxes) would be ensured through proposed monitoring strategies and these may further limit the number of vehicles on the park road.

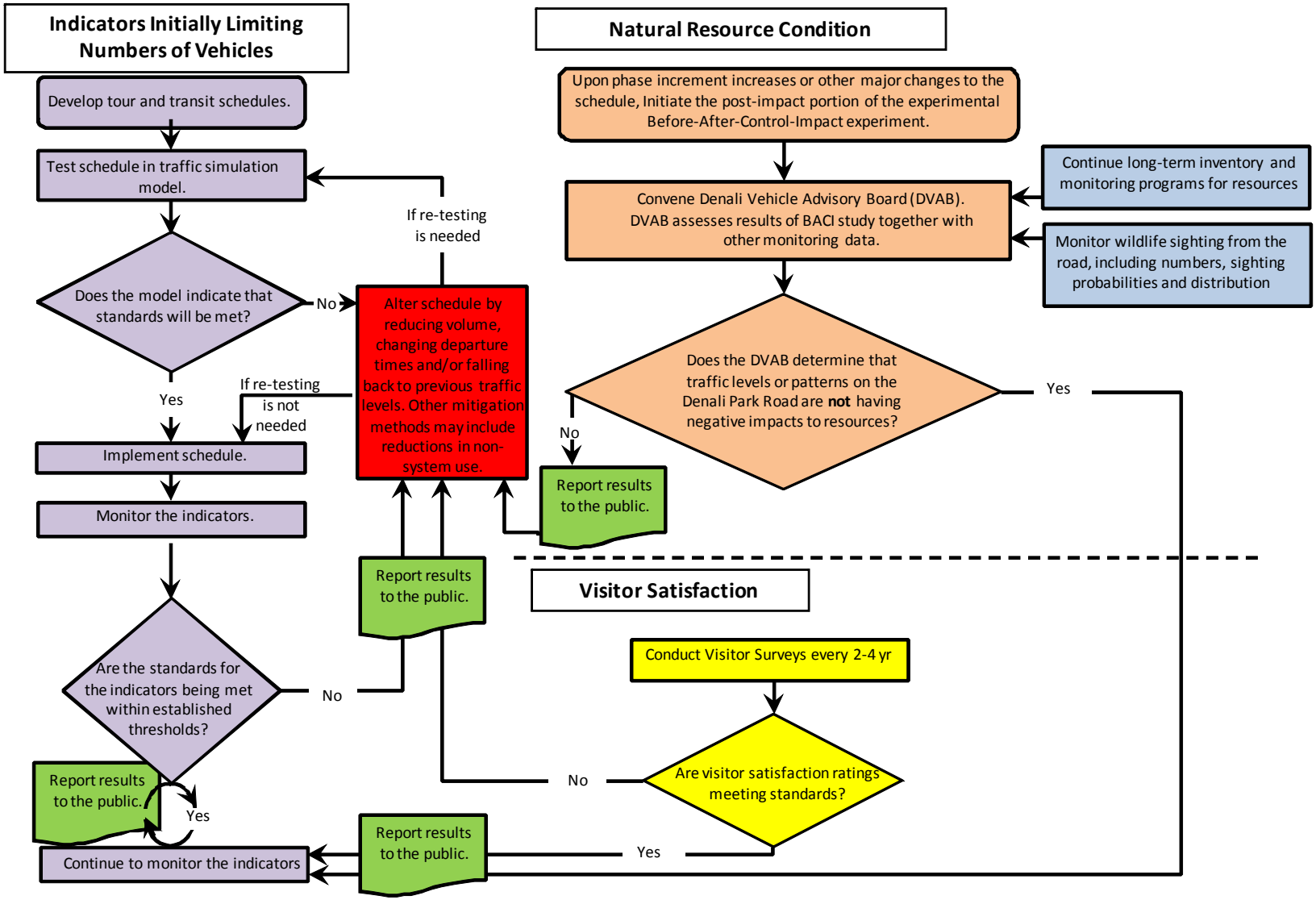


Table 2. Summary of proposed standards for the seven Tier 1 indicators of the Vehicle Management Plan and Environmental Impact Statement. Wildlife viewing subzone 1 extends from the Savage River Check Station to the Teklanika Bridge. In Alternative B, wildlife viewing subzone 2 extends from the Teklanika Bridge to the Old Park Boundary north of Wonder Lake. In Alternatives C and D, wildlife viewing subzone 2 extends from the Teklanika Bridge to the Eielson Visitor Center and from the Wonder Lake Campground 'Y' to the Old Park Boundary north of Wonder Lake. Wildlife viewing subzone 3 is proposed in alternatives C and D, and would extend from the Eielson Visitor Center to the Wonder Lake Campground 'Y'. Bus operating hours are from approximately 6 am to 10 pm. Many of the standards (number of vehicles at wildlife stops and in viewscapes, sheep gaps and hiker wait time) incorporate a 5 year average to allow for aberrant years. Monitoring results will be reported to the public annually, however, for these standards, the park would only be considered out of compliance with the standard if it was below the minimum value reported for each standard, or if a 5 year average was below the desired (higher percentage) condition. For example, for the number of vehicles at a wildlife stop in wildlife viewing subzone 1, the park would be considered out of compliance with the standards if one year had fewer than 70% of stops with 3 or fewer vehicles, or if a 5 year average was less than 75% of stops with 3 or fewer vehicles.

	Standards		
Indicator	Wildlife Viewing Subzone 1	Wildlife Viewing Subzone 2	Wildlife Viewing Subzone 3
Number of vehicles at a wildlife stop	At least 75% of wildlife stops will have 3 or fewer vehicles, averaged over 5 years. No one year will have less than 70% of wildlife stops with 3 or fewer vehicles.	At least 75% of wildlife stops will have 2 or fewer vehicles, averaged over 5 years. No one year will have less than 70% of wildlife stops with 2 or fewer vehicles.	At least 75% of wildlife stops will have 1 or fewer vehicles, averaged over 5 years. No one year will have less than 70% of wildlife stops with 1 or fewer vehicles.
	At least 90% of wildlife stops will have 4 or fewer vehicles, averaged over 5 years. No one year will have less than 85% of wildlife stops with 4 or fewer vehicles.	At least 90% of wildlife stops will have 3 or fewer vehicles, averaged over 5 years. No one year will have less than 85% of wildlife stops with 3 or fewer vehicles.	At least 90% of wildlife stops will have 2 or fewer vehicles, averaged over 5 years. No one year will have less than 85% of wildlife stops with 2 or fewer vehicles.
	At least 95% of wildlife stops will	At least 95% of wildlife stops will have	At least 95% of wildlife stops will

	have 5 or fewer vehicles, averaged over 5 years. No one year will have less than 90% of wildlife stops with 5 or fewer vehicles.	4 or fewer vehicles, averaged over 5 years. No one year will have less than 90% of wildlife stops with 4 or fewer vehicles.	have 3 or fewer vehicles, averaged over 5 years. No one year will have less than 90% of wildlife stops with 3 or fewer vehicles.
Number of vehicles in a viewscape	At least 85% of the time during bus operating hours, there will be 3 or fewer vehicles visible in the Mile 26 viewscape, averaged over 5 years. No one year will have less than 80% of the time during bus operating hours having 3 or fewer vehicles visible in the Mile 26 viewscape.	At least 85% of the time during bus operating hours, there will be 2 or fewer vehicles visible in the Miles 55 and 62 viewscapes, averaged over 5 years. No one year will have less than 80% of the time during bus operating hours having 2 or fewer vehicles visible in the Miles 55 and 62 viewscapes.	At least 85% of the time during bus operating hours, there will be 1 or fewer vehicles visible in the Mile 68 viewscape, averaged over 5 years. No one year will have less than 80% of the time during bus operating hours having 1 or fewer vehicles visible in the Mile 68 viewscape.
	At least 95% of the time during bus operating hours, there will be 4 or fewer vehicles visible in the Mile 26 viewscape, averaged over 5 years. No one year will have less than 90% of the time during bus operating hours having 4 or fewer vehicles visible in the Mile 26 viewscape.	At least 95% of the time during bus operating hours, there will be 3 or fewer vehicles visible in the Miles 55 and 62 viewscapes, averaged over 5 years. No one year will have less than 90% of the time during bus operating hours having 3 or fewer vehicles visible in the Miles 55 and 62 viewscapes.	At least 95% of the time during bus operating hours, there will be 2 or fewer vehicles visible in the Mile 68 viewscape, averaged over 5 years. No one year will have less than 90% of the time during bus operating hours having 2 or fewer vehicles visible in the Mile 68 viewscape.
Number of vehicles parked at one time at:			
Teklanika rest stop	No more than 12 buses at one time with a total of no more than 16 vehicles		

Toklat rest stop		No more than 11 buses at one time with a total of no more than 16 vehicles	
Eielson Visitor Center		No more than 10 buses at one time with a total of no more than 19 vehicles	
Sheep Gap Spacing	Milepoint 21.6 will have at least a 10 minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps) averaged over 5 years. No one year will have less than a 90% success rate (22 of 24 hours).	Milepoints 37.6, 52.8 and 60.6 will have at least a 10 minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps) averaged over 5 years. No one year will have less than a 90% success rate (22 of 24 hours).	Milepoint 68.5 will have at least a 10 minute gap in traffic every hour with a 95% success rate (23 of 24 hours with gaps) averaged over 5 years. No one year will have less than a 90% success rate (22 of 24 hours).
Night-time traffic	There will be an average 3 vehicles or fewer per hour (total westbound and eastbound) passing any of the traffic counters west of Savage between 10 pm and 6 am, with a 95% success rate, and with never more than 6 vehicles in any one hour, also with a 95% success rate. This limit will undergo further analysis to ensure it does not impact wildlife sightings the following morning and will be lowered if an impact is detected. To further understand the relationship between night-time traffic and wildlife sightings the following morning, for the first two years following implementation of the plan only, there may be brief exemptions from this standard for periods not to exceed 2 weeks and no more than two exemption periods in an operating season for the purpose of experimental increases in traffic.		
Large vehicle traffic	There will never be more than 4 vehicles (total westbound and eastbound) larger than 80,000 lbs gross vehicle weight (GVW) in any one hour passing any of the traffic counters west of Savage. This limit will undergo further analysis to ensure it does not impact wildlife sightings the following morning and will be lowered if an impact is		

	detected.
Hiker Wait Time	At least 75% of hikers will have wait times of less than 30 minutes for pick-up by a bus, averaged over 5 years. No one year will have less than 70% of hikers with wait times of less than 30 minutes.
	At least 95% of hikers will have wait times of less than 60 minutes for pick-up by a bus, averaged over 5 years. No one year will have less than 93% of hikers with wait times of less than 60 minutes.
	At least 99% of hikers will have wait times of less than 90 minutes for pick-up by a bus, averaged over 5 years. No one year will have less than 98% of hikers with wait times of less than 90 minutes.

Tier 1: Indicators Limiting the Number of Vehicles on the Park Road

Of the seven tier 1 indicators identified, six of them would ultimately limit the volume of traffic past the Savage Check Station on the Denali park road. Three of them are designed to protect wildlife by controlling sheep gap spacing, night-time traffic and construction traffic volumes. The other three would protect the visitor experience by limiting the numbers of vehicles at wildlife stops, in viewscapes and at rest stops. The seventh indicator (hiker wait time) is designed to ensure a viable transit system and would not ultimately influence the numbers of vehicle allowed on the road but would influence the allocation of those vehicles between tour and transit services. The standards for these indicators are summarized in Table 2.

Numbers of Vehicles at Wildlife Stops, in Viewscapes and at Rest Stops



As part of the Road Capacity Study, researchers from the University of Vermont conducted qualitative visitor surveys in 2006 to identify factors that are important to visitor satisfaction and that would make for readily measurable indicators. While a number of indicators were identified that were important to the visitor experience, three that related specifically to vehicle crowding on the road were considered. The selected factors were the number of vehicles at wildlife stops, in iconic viewscapes and at rest stops. Quantitative surveys were then conducted in 2007 resulting in the development of social norm curves (Manning 2007, Manning and Hallo 2009, Manning and Hallo 2010) to help the park understand how current crowding levels related to visitor perceptions. For these surveys, visitor reactions were discerned to increasing numbers of vehicles. Visitors were shown a series of photos of the same scene with increasing numbers of buses and asked to score each photo from 4 (very acceptable) to -4 (very unacceptable). Social normative curves were fit to the results to identify visitor reactions to different crowding levels and provide guidance to park management in setting standards. For the numbers of vehicles parked at one time at the Teklanika and Toklat rest stop and at the Eielson Visitor Center park management has decided to use

the design standards of those facilities to determine the number of vehicles parked at one time.

Standards

The over-arching goal for setting these standards is to maintain or improve the current condition, or to maintain numbers of vehicles at these locations similar to or less than what they are currently. Several sources of data were considered in developing these standards, including results of visitor surveys (Manning and Halo 2010), staff observations of the park road (Phillips et al. 2012), and results of the traffic model.

Results of the social normative curves developed by Manning and Halo (2010) indicate visitor acceptance of different crowding levels (Table 3). From 2007-2010 the Denali Park Road Capacity Study collected information on numbers of vehicles at wildlife stops, in viewscapes and at rest stops/visitor center. In addition, the Minnesota Traffic Observatory was requested to assess the conditions for the day on which their model is based (July 25, 2007) using a combination of actual GPS location data for the buses and the traffic model.

Table 3. Results from the 2007 quantitative visitor surveys (Manning and Halo 2010). Denali management considered three levels of visitor-perceived crowding to be the range of values to consider for standards. 'Preference' is the level of vehicle crowding visitors reported being what they would prefer to see; 'typically seen' is the level visitors reported as being most representative of that they saw on their trip out the road (based on staged photographs they were shown); and 'acceptable' is the 50th percentile of the distribution of the curves, whereby 50% of people found that level of crowding acceptable and 50% found it unacceptable. The scenic rest stop area for this study was Polychrome, which is no longer in existence as a rest stop.

	Norm Standard Levels (number of buses)		
Crowding Indicator	Preference	'Typically Seen'	Acceptable
Scenic Rest stop Area	2.24	3.57	5.48
Iconic Road	2.43	3.80	5.95
Alternate Road	2.17	3.51	5.68
Wildlife Encounter	1.75	3.06	4.85

Number of vehicles stopped at the same location to view wildlife

The current average number of vehicles stopped at wildlife sightings has ranged from 1.58 to 1.69 over the last 4 years based on staff observations (Table 4). These values represent only stops to observe wildlife with at least one vehicle present (i.e. when road study staff observe wildlife with no other vehicles present, these occurrences are not included). In these observations, typically at least 50% of the wildlife stops have only one vehicle present. 75% of the wildlife stops have one or two vehicles present. The maximum value reported in staff observations is 7 and this value occurs approximately 1 % of the time (Table 4). In their assessment of current condition, the Minnesota Traffic Observatory estimates the average number of vehicles at wildlife stops to be 0.70. Their estimated maximum is 8 vehicles, occurring much less than 1 % of the time (Table 4).

When these results are placed in context with the visitor survey results, the park is generally achieving 'preference' more than 75% of the time, achieving the perceived 'typically seen' more that 90% of the time and 'acceptable' more that 95% of the time (Table 5). With a desire to preserve this distribution, whereby most stops will have 2 or fewer vehicles but some stops will have 3 or more, the park is proposing the gradient of standards as presented in Table 2 (see pages 9 – 11) and achieve these values over a 5 year time period to allow for aberrant years. Monitoring results will be reported to the public annually, however, the park would only be considered out of compliance with the standard if the results are below the minimum value reported for each standard, or if a 5 year average was below the desired (higher percentage) condition (Table 2).

Table 4. Mean and maximum numbers of vehicles at wildlife stops based on the exponential distribution of the data estimated by the Minnesota Traffic Observatory (MTO) and observed Denali National Park and Preserve (DNPP) staff.

	Mean	Maximum	Sample Size
2007 - MTO	0.70	8	30 simulations
2007 – DNPP Staff	1.58	6	65
2008 – DNPP Staff	1.69	6	91
2009 – DNPP Staff	1.64	7	68
2010 – DNPP Staff	1.59	7	333

Table 5. Proportion of wildlife viewing stops that have equal to or fewer vehicles. For example, for the combined data, 89% of observed wildlife stops had 3 or fewer vehicles present. Data in the columns labels 2007 – 2010 are from wildlife stops observed by the Road Capacity Study. Column labeled 'Combined' are an average of the 4 yr of Road Capacity Study data. Column labeled 'Model/GPS' are results of the traffic model for the current condition. Gray lines highlight where the results of the Manning and Hallo (2010) study are in reference to the data collected by the Road Capacity Study or generated by the traffic model, with the assumption that the 'observing bus' was not counted in the visitor surveys (i.e. one bus has been added to the Manning and Hallo (2010) results for comparison purposes).

	# of Vehicles	2007	2008	2009	2010	Combined	Model/GPS
	1	0.52	0.47	0.50	0.54	0.52	0.79
	2	0.77	0.76	0.75	0.77	0.77	0.96
Preference	2.75 including observing bus						
	3	0.92	0.88	0.91	0.88	0.89	0.99
	4	0.97	0.90	0.93	0.95	0.94	1.00
'Typically seen'	4.06 including observing bus						
	5	0.98	0.97	0.96	0.98	0.97	1.00
Acceptable	5.85 including observing bus						
	6	1.00	1.00	0.99	0.99	0.99	1.00
	7			1.00	1.00	1.00	1.00
	8						1.00

Number of vehicles visible at one time in scenic viewscapes

There was good agreement with the Minnesota Traffic Observatory (MOT) results and staff observations for each of the viewscapes (Tables 6, 7 and 8). Both staff observations and MTO results were recorded the same way: every 2 minutes the number of vehicles in the viewscape, from specified start and end points, were recorded, hence zeros are

frequent. However, as zeros occur with high frequency during off-peak times (overnight), their inclusion can bias the average low, so the decision has been made to use data only when there is a vehicle present (Tables 6, 7 and 8). Again, similar to how the standards for wildlife stops were developed, the park is recommending different levels of crowding to protect the predominance of very low levels of crowding currently observed (Table 2, see pages 9-11) and achieve these values over a 5 year time period to allow for aberrant years. Monitoring results will be reported to the public annually, however, the park would only be considered out of compliance with the standard if the results are below the minimum value reported for each standard, or if a 5 year average was below the desired (higher percentage) condition (Table 2).

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Table 6. Proportion of observed time that equal to or fewer vehicles are observed in the Mile 26 viewscape. For example, when there is a vehicle present (excluding 'zero' observations) 97% of the time there are 3 or fewer vehicles in the viewscape. Data are from staff observation by the Road Capacity Study. Gray lines highlight where the results of the Manning and Hallo (2010) study are in reference to the data collected by the Road Capacity Study or generated by the traffic model, with the assumption that the 'observing bus' was not counted in the visitor surveys (i.e. one bus has been added to the Manning and Hallo (2010) results for comparison purposes). The Mile 26 viewscape was not part of the Manning and Hallo (2010) study; however the visitor preference values for the 'alternative road' viewscape were applied here.

	Excluding 'zero' observations	
	Vehicles	STAFF OBS
	1	0.53
	2	0.87
	3	0.97
Preference	3.17 including observing vehicle	
	4	0.99
'Typically seen'	4.51 including observing vehicle	
	5	1.00
	6	1.00
Acceptable	6.68 including observing vehicle	

Table 7. Proportion of observed time that equal to or fewer vehicles are observed in the Mile 55 viewscape. For example, when there is a vehicle present (excluding 'zero' observations) 92% of the time there are 3 or fewer vehicles in the viewscape. Data are from staff observation by the Road Capacity Study. Gray lines highlight where the results of the Manning and Hallo (2010) study are in reference to the data collected by the Road Capacity Study or generated by the traffic model, with the assumption that the 'observing bus' was not counted in the visitor surveys (i.e. one bus has been added to the Manning and Hallo (2010) results for comparison purposes).

	Excluding 'zero' observations	
	Vehicles	STAFF OBS
	1	0.57
	2	0.80
	3	0.92
Preference	3.17 including observing vehicle	
	4	0.97
'Typically seen'	4.51 including observing vehicle	
	5	0.99
	6	1.00
Acceptable	6.68 including observing vehicle	

Table 8. Proportion of observed time that equal to or fewer vehicles are observed in the Mile 62 viewscape. For example, when there is a vehicle present (excluding 'zero' observations) 93% of the time there are 3 or fewer vehicles in the viewscape. Data are from staff observation by the Road Capacity Study. Gray lines highlight where the results of the Manning and Hallo (2010) study are in reference to the data collected by the Road Capacity Study or generated by the traffic model, with the assumption that the 'observing bus' was not counted in the visitor surveys (i.e. one bus has been added to the Manning and Hallo (2010) results for comparison purposes).

	Excluding 'zero' observations	
	Vehicles	STAFF OBS
	1	0.50
	2	0.84
	3	0.93
Preference	3.43 including observing vehicle	
	4	0.96
'Typically seen'	4.80 including observing vehicle	
	5	1.00
	6	1.00
Acceptable	6.95 including observing vehicle	

Number of vehicles parked at any one time at rest stops and at the Eielson Visitor Center

For the Teklanika and Toklat rest stops and the Eielson Visitor Center, park management recommends using the design standards for the parking lots for each of those facilities as the standards for numbers of vehicles parked at any one time (Table 2, see pages 9-11).

Monitoring strategy - Alternative A (no action)

- Vehicles at wildlife stops, in viewscapes and at rest stops. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. It would be anticipated that the current condition would be maintained and no monitoring for numbers of vehicles at wildlife stops, in viewscapes, or at rest stops and the Eielson Visitor Center would be conducted.

Monitoring strategy - Action Alternatives B, C & D

- Number of vehicles stopped at the same site to view wildlife. This indicator would be monitored both remotely and directly. For remote monitoring, all buses (concessioner and lodge) and NPS vehicles would be equipped with GPS units that will store and transmit data for each trip. In addition, other park road users would be issued GPS units on a voluntary basis. These data would be analyzed at the end of the season to ensure numbers of vehicles at any given wildlife stop do not exceed the standard. For direct monitoring, staff would periodically monitor wildlife stops using set protocols from both government vehicles and concessioner buses to ensure the standard and is not exceeded and/or the success rate is being met. Both the direct and indirect data would be used to determine if the standard is being exceeded. If the standard is not being met, mitigation steps would include changes to the schedule, removal of buses from the schedule, or stepping the system back to the level it was last operating at without exceeding the standards. These changes would occur between seasons.

- Number of vehicles visible at one time in scenic viewscapes. The units of the standard would be the number of vehicles visible in a designated length of the park road at any given time. Four viewscapes have been identified where the viewscape contains one or more miles of the park road. The exact length of road visible for each viewscape varies. These viewscapes occur at approximately miles 26, 55, 62 and 68. These values would be averaged over days, weeks, months and or the season.

  This indicator would be monitored both remotely and directly. For remote monitoring, all buses (concessioner and lodge) and NPS vehicles would be equipped with GPS units that would store and transmit data for each trip. In addition, other park road users would be issued GPS units. For professional photographers, these units would be required as a condition of their permit. These data would be analyzed at the end of the season to ensure numbers of

vehicles visible in scenic viewscapes do not exceed the standard. For direct monitoring, staff would periodically monitor viewscapes using established protocols to ensure the standard is not exceeded. Both the direct and indirect data would be used to determine if the standard is being exceeded. If the standard is not being met, mitigation steps would include changes to the schedule, removal of buses from the schedule, or stepping the system back to the level it was last operating at without exceeding the standards. These changes would occur between seasons.

- Number of vehicles parked at any one time at rest stops and at the Eielson Visitor Center. The units of the standard would be the number of vehicles parked at a rest stop or the Eielson Visitor Center at any given time. The rest stops are Teklanika and Toklat. The standards set will vary between the three sites as each has different design capacities for their facilities. As with wildlife stops, to allow for unexpected events, it is possible the park will set a desired success rate that would allow the standard to be exceeded a small number of times before management action is taken.

  This indicator would be monitored both remotely and directly. For remote monitoring, all buses (concessioner and lodge) and NPS vehicles would be equipped with GPS units that would store and transmit data for each trip. In addition, other park road users would be issued GPS units on a voluntary basis. These data would be analyzed at the end of the season to ensure numbers of vehicles parked at rest stops or at the Eielson Visitor Center at any one time do not exceed the standard. For direct monitoring, staff would monitor parking areas at the rest stops and the Eielson Visitor Center using both government vehicles and by riding concessioner buses to ensure the standard is not exceeded. Both the direct and indirect data would be used to determine if the standard is being exceeded. If the standard is not being met, mitigation steps would include changes to the schedule, removal of buses from the schedule, or stepping the system back to the level it was last operating at without exceeding the standards. These changes would occur between seasons.

Sheep Gap Spacing

Results of the Road Capacity Study (Phillips et al. 2010) combined with earlier studies (Tracy 1977, Singer and Beattie 1986, Burson et al. 2000) suggest that while there is no strong evidence of mechanistic relationships between traffic volumes or patterns and

wildlife distribution or movements that would lead to clear indicators and standards, there are hints of negative relationships that warrant caution before implementing changes to the current traffic levels. The clearest negative impacts detected were in the ability of Dall sheep to move across the park road and reductions in sightings of large mammals along the road corridor following periods of high night-time traffic levels (Phillips et al. 2012).

In 2007, 20 Dall sheep were outfitted with GPS collars and 18 of those provided location data throughout that season (mid-May to mid-September). Results of that study demonstrated that sheep move farther away from the road at higher traffic volumes, suggesting that increases in traffic volume may impede them further. If the sheep maintain farther distances from the road, this could reduce the amount of habitat available for foraging, which is most relevant during the spring when sheep frequently cross the road and vegetation has not yet emerged at higher elevations (Putera and Keay 1998, Dalle-Molle and Van Horn 1991, Phillips et al. 2010). As a result the park is proposing an indicator which would require that a gap in traffic occur each hour for a minimum length of time. There are critical locations along the road corridor that are known crossing points and these would be monitored to ensure that the gap is occurring. Any proposed schedule will first be run through the traffic simulation model to test if it is likely to provide the desired gaps in traffic.



Standard

The results of the 2007 study corroborated what has been shown in other studies: that Dall sheep are inhibited from crossing the road at high traffic levels. Putera and Keay (1998) observed that in periods of no traffic, Dall sheep readily crossed the Park Road. Times to cross the road were 2, 3 and 13 minutes, with an average of 6 minutes (Putera and Keay 1998, their Table 8). Based on these observations, the standard for this indicator is a 10 minute gap in traffic at key sheep crossing locations (miles 21.6, 37.6, 52.8, 60.6, 68.5) with a 95% success rate for each crossing location, in other words, each location will have the gap at least 23 out of every 24 hours, averaged over 5 years to allow for aberrant years. However, no year will have less than a 90% success rate (22

out of every 24 hours). Monitoring will be ongoing and results will be reported to the public annually, however, in a given year, the park will not be out of compliance with the standard unless the success rate is less than 90%, or a 5 year average is less than a 95% success rate. The 10 minute Dall sheep gap spacing offers the best likelihood of balancing the need to not disrupt the migratory pattern of the less habituated sheep groups with the desire to not unnecessarily restrict traffic and thus displace visitors.

While sheep migrations are seasonal, the intention is to maintain the sheep gaps throughout the season. Maintaining these gaps throughout the system is important for ensuring that standards are not violated in the critical migration crossing while maintaining a smooth traffic flow. There are three reasons for maintaining the gaps throughout the season in decreasing order of importance. 1) Uncertainty as to the exact variation in timing of migration or foraging movements especially in the light of climate changes. 2) There are other species that must cross the road and are affected by traffic and they have experienced historically a traffic level which has allowed at least one 10 minute gap in vehicles an hour. Significant uncertainty exists about the relationship between traffic and these species. 3.) Having a system which varies based on the presence of sheep would require significantly increased complexity to maintain and would probably require continual radio-tracking of sheep, which presents unacceptable risks.

Monitoring strategy - Alternative A (no action)

- Sheep Gap Spacing. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. However, as the Road Capacity Study has highlighted an issue with sheep crossing, it is likely that 10 minute gaps would still be required under this alternative and schedule adjustments would be made to achieve these gaps.

Monitoring strategy - Action Alternatives B, C & D

- Sheep Gap Spacing. This indicator would be monitored both remotely and directly. For remote monitoring, all buses (concessioner and lodge) and NPS vehicles would be equipped with GPS units that store and transmit data for each trip. In addition, other park road users, such as professional photographers, Kantishna inholders and their visitors, researchers, etc., would be issued GPS units on a voluntary basis. These data would be analyzed to ensure that the standard for hourly gaps in traffic is being met. For direct monitoring, staff would periodically monitor critical sheep crossing sites during peak traffic times to ensure the standard is not being exceeded. Both the direct and indirect data

would be used to determine if the standard is being exceeded. If the standard is not being met, mitigation steps would include changes to the schedule, removal of buses from the schedule, or stepping the system back to the level it was last operating at without exceeding the standards. These changes would occur between seasons.

Night-time Traffic Levels

Currently, concession buses are on the restricted section of the road from about 06:00 am to 10:00 pm, with normal night-time traffic levels outside of these hours being very low (0-2 vehicles per hour based on traffic counters). While it is unclear what the exact relationship is between this period of low traffic and wildlife behavior along the road corridor, analyses have shown that unusually high night-time traffic levels have a strong correlation with decreased wildlife sightings the following morning (Phillips et al. 2012). As a result, Denali will limit the numbers of vehicles driving through wildlife sensitive areas during the night-time hours (10 pm to 6 am) to preserve and protect day-time wildlife sightings.

Standard

There will be an average of three or fewer vehicles per hour (total westbound and eastbound) passing any of the traffic counters west of Savage between 10 pm and 6 am, with never more than six vehicles in any one hour.

Monitoring strategy - Alternative A (no action)

- Night-time traffic levels. Under this alternative, the current level of 10,512 vehicles per season would be maintained and the contractor traffic, which operates principally at night, would continue to not be counted within the 10,512 limit. Also under this alternative, Denali would not establish indicators and standards. However, given that the Road Capacity Study has identified that high night-time traffic volumes result in decreased wildlife sightings, it is likely that mitigation efforts would be taken to limit night-time traffic and influence behavior of large vehicles (i.e. reduce speed and brake noise). Wildlife sightings data would continue to be collected from the buses.

Monitoring strategy - Action Alternatives B, C & D

- Night-time traffic levels. This indicator would be monitored remotely using traffic counters at several locations along the park road. These data would be used to determine if the standard is being exceeded.

Large Vehicle Traffic

One of the uncertainties relating to the relationship between night-time traffic and morning wildlife sightings is the specific impact of large vehicles, including both contractor vehicles and NPS maintenance vehicles and there is concern that large vehicles will have a similar impact at any time of day. These impacts may be due to the nature and behavior of these vehicles in that they produce more noise and dust; and likely move more quickly when passing wildlife than do visitor buses that stop to view the wildlife. Thus modifications to vehicle speed and behavior may help to mitigate impacts. However, in addition to any modifications in behavior, Denali will limit the numbers of large vehicles driving through wildlife sensitive areas during all hours of the day to reduce impacts to wildlife and preserve wildlife sighting opportunities.

Due to the uncertainties surrounding the current data, additional studies will be carried out in the upcoming years, and adjustments may be made to the standards based on new information (Table 2).

Standard

For vehicles larger than 80,000 lbs gross vehicle weight (this does not include concessioner buses), there will never be more than six vehicles in any one hour (total westbound and eastbound) passing any of the traffic counters west of Savage at any time of day. This limit will undergo further analysis to ensure it does not impact wildlife sightings the following morning and will be lowered if an impact is detected.

Monitoring strategy - Alternative A (no action)

- Large vehicle traffic levels. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. However, given that the Road Capacity Study has identified that high night-time traffic volumes, and, potentially, large vehicles in general result in decreased wildlife sightings, it is likely that mitigation efforts would be taken to limit this type of traffic and influence behavior of large vehicles (i.e. reduce speed and brake noise). Wildlife sightings data would continue to be collected from the buses.

Monitoring strategy - Action Alternatives B, C & D

- Large vehicle traffic levels. This indicator would be monitored remotely using traffic counters at several locations along the park road. These data would be used to determine if the standard is being exceeded.

Tier 1: Indicator Monitoring the Effectiveness of the Transit System



Hiker Wait Time

Effectiveness of the transportation system in serving the needs of visitors can be measured by looking at two domains; the ability of visitors entering the park to acquire a seat on a bus and the wait time for hikers reboarding buses to exit the park. Controlling the wait time for hikers requires adequate numbers of buses passing by in a given hour along the full length of the road and for these buses to have room on them to pick up additional passengers. Because of this, wait time for hikers is also an effective indicator for the ability of visitors to acquire a seat into the park.

Hiker wait times that begin to consistently approach or exceed the standard are an indication that there is not adequate transit service and additional buses would be added to the schedule at the times when there is need. Unlike the current General Management Plan and subsequent amendments, this plan will not specify an allocation of concessioner buses between tour and transit (i.e. the current seasonal limits of 2089 tour buses, 3394 transit buses, and 550 annual buses that can be allocated at the Superintendent's discretion). The purpose of not defining this allocation is to maintain flexibility in the system to respond to changing visitor demands. This plan expressly states that transit needs will be prioritized over tours and that transit service will be maintained to a level that meets the standard for hiker wait time. If an increase in transit service is necessary it may be balanced by a decrease in tour services if that is required for compliance with the standards controlling the number of buses on the road.

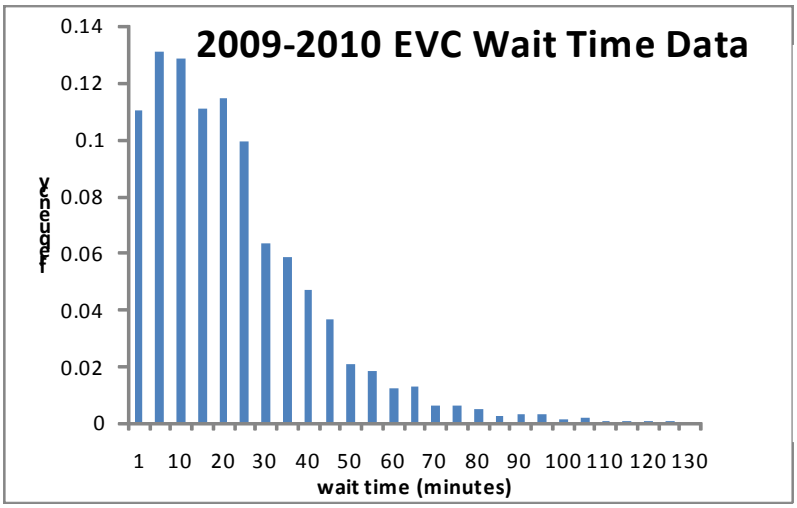
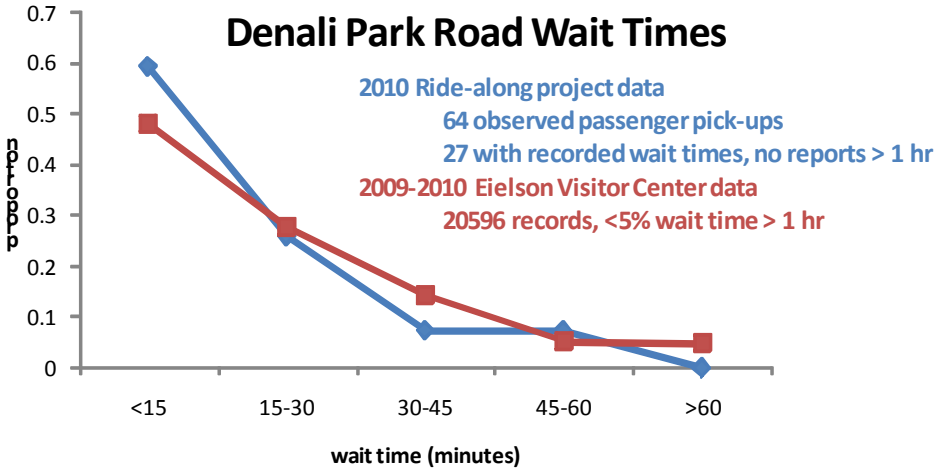


Figure 2. Distributions of wait time for passengers waiting for an east-bound bus at the Eielson Visitor Center. The arithmetic mean of the distribution is 22.5 minutes, the median is 20 minutes.

Figure 3. Comparison of reported wait times from the Eielson Visitor Center data and data collected by NPS staff riding buses.



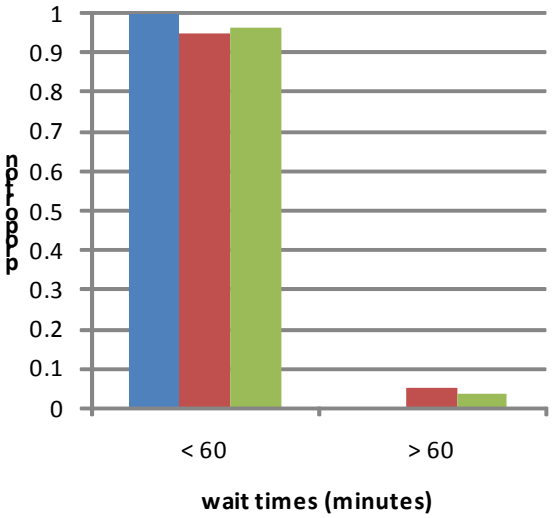


Figure 4. Comparison of reported wait times from the Eielson Visitor Center data (red bar; N = 20596), data collected by NPS staff riding buses (blue bar; N = 27), and data collected by concessioner bus drivers (green bar; N = 5388). Bus driver data is collected only as a yes/no answer to waiting more than one hour.

Standard

Park managers had three sources of data for the current distribution of hiker wait times: data collected by the concessioner at the Eielson Visitor Center (Fig. 2, 3 & 4), data collected by the concessioner bus drivers as they pick up hikers (Fig. 3 & 4); and data collected by NPS staff while riding buses (Fig. 4). As an additional consideration in determining the standard, the current bus transportation contract requires the fleet operator to maintain a one hour or less time period for passengers waiting along the park road west of mile 20. Based on an analysis of the data and the current contract requirement, park management recommends standards as described in Table 2 and achieve these values over a 5 year time period to allow for aberrant years. Monitoring results will be reported to the public annually, however, the park would only be considered out of compliance with the standard if the results are below the minimum value reported for each standard, or if a 5 year average was below the desired (higher percentage) condition (Table 2).

Monitoring strategy - Alternative A (no action)

- Hiker Wait Time. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. The operating plan of the current concession contract requires that the transit system operate in a demand responsive manner to hikers waiting along the park road for pickup. The NPS standard is to provide transportation within one hour to all passengers waiting along the Park Road west of Mile 20. The Concessioner is required to monitor wait times on an ongoing basis, providing necessary response as needed. The NPS and the Concessioner continually monitor and respond to delays in wait time. When the NPS standard is not expected to be met, the Concessioner may elect to provide additional buses within the parameters of the allocation system. Furthermore, in response to not meeting the NPS standard, the Concessioner may be required to provide additional bus service within 2 hours of notice.

Monitoring strategy - Action Alternatives B, C & D

- Hiker Wait Time. Denali would require the operator of the transportation system to monitor wait times on an ongoing basis along the park road by having bus drivers record how long hikers waited along the road for pick-up. Compliance with this requirement would be tested by the park with spot checks. Data collected through this monitoring would be forwarded to the Commercial Services Division on a regular basis and analyzed for compliance with the

standard. If hiker wait times are not in compliance with the standard, mitigation would include leaving more empty seats on buses leaving the Wilderness Access center and/or adding buses to the schedule. The latter may conflict with the visitor crowding standards and would only be implemented if it would not cause those indicators to be out of compliance with their standards. Mitigation efforts to ensure compliance with the standards controlling the number of buses on the road would include the use of 'deadheads' or empty buses whose behavior would minimize impacts to the crowding standards. If additional buses on the road would negatively impact compliance with the other standards, the park would look to reducing non-system use as specified in Chapter 2 of the EIS. If the standards continue to not be met, as a last resort, allocation may be moved from tours to transit to meet the demand for transit, thereby meeting the wait-time standard, however this can only happen with a two year advanced notice to the concessioner.

Comprehensive Monitoring Strategies to Ensure Traffic Levels Do Not Negatively Impact Natural Resources or Visitor Experience



Natural Resource Condition

The park is proposing a comprehensive monitoring program combined with a formal Before-After-Control-Impact (BACI) study (Underwood 1994, Smith 2002) to ensure that there would be no increased impacts to wildlife along the park road as a result of increased levels of traffic or changes in traffic patterns. The experimental BACI study would involve repeating the satellite telemetry studies of movement and behavior of grizzly bears and Dall sheep to determine if there have been changes attributable to changes in traffic patterns or volume. These data would be combined with the longer-term time series data from the tiers two and four level parameters (Table 1).

Detecting differences attributable to changes in traffic volumes or patterns will be complex and hence Denali is proposing to convene a Denali Vehicle Advisory Board (DVAB) which will be composed of agency and academic scientists. Following the BACI studies, the DVAB will consider all of the available data to determine if there have been detrimental or potentially detrimental impacts on the park's natural resources as a result of traffic volumes or patterns on the park road. Any one metric may show a change after implementation of this plan, but this alone may not be indicative of a problem associated with traffic levels and so the data will be looked at by the DVAB as a

whole. The park will also allow for the flexibility to add or remove metrics to Tiers 2 through 4 parameters (Table 1) based on recommendations by the DVAB.

Monitoring strategy - Alternative A (no action)

- Natural Resource Condition. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. While ongoing monitoring of some of the metrics listed in Table 1 would continue, they would not explicitly be used to detect impacts to resources.

Monitoring strategy - Action Alternatives B & C

- Tier two parameters. Observations of wildlife along the road corridor would be made on a regular basis by park staff, including information on group size, age and sex composition, and distance from the road. These data will be analyzed to monitor, among other things, wildlife sighting probabilities and distributions along the park road, and distance from the road (Table 1). These data collection efforts would be ongoing.

- Tier three parameters. Upon a major change in traffic volume or patterns, the BACI study would be initiated. This would first occur with implementation of either of the action alternatives and an increase in traffic that is based on what the simulation model indicates is possible over current levels. Simulations currently suggest that an increase of approximately 10% (see Appendix D) of the current allocation of concession buses is possible while still meeting standards, although further modeling may find a more efficient schedule that would allow higher levels of traffic. Given current visitation rates and projections, it is unlikely that the concessioner would be able to realize a 10% increase by implementation in 2015. However, the park would allow up to this 10% increase in 2015. Following the increase in traffic, satellite telemetry studies of grizzly bears and Dall sheep would be reinitiated. Results of this study and the time-series of Tier two and four data would be analyzed by the DVAB to detect detrimental impacts of the traffic on natural resources along the road corridor. Potential detrimental impacts would include evidence of animals increasingly avoiding the road corridor as detected through wildlife sightings data and habitat use studies. Following analysis of results from this study, the DVAB would make recommendations for any further increases in traffic it considered to be possible. The DVAB may also recommend no further increases in traffic or decreases in traffic if detrimental impacts are detected. The BACI study may again be initiated

following additional increases in traffic, with results assessed by the DVAB. Similarly, if no detrimental impacts are detected, additional increases may follow as proposed by the DVAB, potentially accompanied by BACI studies until full implementation of the traffic levels suggested possible by the traffic model. Alternatively, if detrimental impacts are detected at any point in the BACI study, the traffic system would be stepped back to the previous level at which no impact was detected. It is likely that the BACI study would be repeated to determine if the reduction in traffic was effective at mitigation the impact to resources.

- Tier four parameters. These are parameters currently being monitored by the NPS Inventory and Monitoring program and include population surveys for caribou, moose, Dall sheep and wolves along with the collection of certain demographic and distribution data. These data collection efforts would be ongoing.

Monitoring strategy - Action Alternatives D (NPS Preferred Alternative)

- Tier two parameters. Observations of wildlife along the road corridor would be made on a regular basis by park staff, primarily from buses though also from government vehicles, including information on group size, age and sex composition, and distance from the road. These data will be analyzed to monitor, among other things, wildlife sighting probabilities and distributions along the park road, and distance from the road (Table 1). These data collection efforts would be ongoing.

- Tier three parameters. Approximately two years following the implementation of the new concessions contract, including increased tours traveling to Teklanika and the Eielson Visitor Center, the BACI study would be initiated. Satellite telemetry studies of grizzly bears and Dall sheep would be reinitiated. Results of this study and the time-series of Tier two and four data would be analyzed by the DVAB to detect detrimental impacts of the traffic on natural resources along the road corridor. Potential detrimental impacts would include evidence of animals increasingly avoiding the road corridor as detected through wildlife sightings data and habitat use studies. Following analysis of results from this study, the DVAB would make an assessment regarding any impacts of new traffic patterns and any increase in traffic volumes that might have occurred on wildlife. The DVAB may also recommend a decrease in traffic if detrimental impacts are detected. Given current visitation projections, it is possible that following implementation of the new concessions contract, visitation may not increase

substantially, and therefore little increase in traffic levels may be realized. If visitation does increase at some point in the future along with increased traffic volumes higher than the current volumes but less than the 160 daily maximum proposed in this alternative, the BACI study may again be initiated, with results assessed by the DVAB to ensure this level of traffic is not having a negative impact. No increase beyond 160 vehicles per day will be allowed without additional NEPA compliance.

- Tier four parameters. These are parameters currently being monitored by the NPS Inventory and Monitoring program and include population surveys for caribou, moose, Dall sheep and wolves along with the collection of certain demographic and distribution data. These data collection efforts would be ongoing.

Visitor Satisfaction

The Visitors Services Project (VSP) was created to enable parks to detect specific causes of people being satisfied or unsatisfied with their visit to the park. The surveys ask visitors a suite of questions designed to provide managers with scientific information that can then be used to identify issues and improve services. Denali conducted a VSP survey in 2006 and overall 93% of visitors surveyed rated the quality of services, facilities and recreational opportunities as good or very good. It is anticipated that this level of satisfaction will remain the same or increase with the implementation of one of the action alternatives.

Monitoring strategy - Alternative A (no action)

- Visitor satisfaction. Under this alternative, the current level of 10,512 vehicles per season would be maintained and Denali would not establish indicators and standards. While visitor satisfaction surveys would continue to be administered as required, the results would not be compared to standards as an indicator and standards approach is not part of this alternative.

Monitoring strategy - Action Alternatives B, C & D

- Visitor satisfaction.The VSP tool would be used to ensure continued high levels of satisfaction. It would be first initiated along with the post-impact BACI study and would continue to be implemented every 2-4 years. If surveys indicate a decreased satisfaction with crowding levels along the road, the park may initiate

new focused visitor surveys similar to the 2006 and 2007 surveys (Manning et al 2010) to determine if visitor preferences have changed. The park may also remove buses from the schedule, or step the system back to the level it was last operating at with a high level of visitor satisfaction. These changes would occur between seasons.

Literature Cited

Adams, L. G. and G. H. Roffler. 2009. Dynamics of the Denali Caribou Herd, Denali National Park, Alaska: Progress Report (October 2008 – September 2009). U.S. Geological Survey - Alaska Science Center, Anchorage, Alaska.

Burson, S. L., J. L. Belant, K. A. Fortier, and W. C. Tomkiewicz. 2000. The effect of vehicle traffic on wildlife in Denali National Park. Arctic 53:146-151.

Dalle-Molle, J., and J. Van Horn. 1991. Observations of vehicle traffic interfering with migration of Dall sheep (*Ovis dalli dalli*), in Denali National Park, Alaska. Canadian Field Naturalist 105:409-411.

Manning, R.E. 2007. Parks and carrying capacity: commons without tragedy. Island Press, Washington, D.C. 313pp.

Manning, R.E. and J.C. Hallo. 2009. Indicators and standards of quality for the visitor experience on the Denali Park Road. Draft Report. Park Studies Laboratory, University of Vermont (http://www.nps.gov/dena/naturescience/upload/Visitor%20Experience%20Draft%20Final%20Report_2009.pdf).

Manning, R.E., and J.C. Hallo. 2010. The Denali park road experience: Indicators and standards of quality. Park Science 27:33-41.

Meier, T.J. 2009. Vital Signs Monitoring of Wolf (*Canis lupus*): Distribution and Abundance in Denali National Park. Natural Resource Data Series NPS/CAKN/NRDS 2009/009. National Park Service, Fort Collins, Colorado.

Morris, T.M., J. Hourdos, M. Donath and L. Phillips. 2010. Modeling traffic patterns in Denali National Park and Preserve to evaluate effects on visitor experience and wildlife resources. Park Science 27:48-57.

National Park Service. 2009. "Surveying Dall Sheep Populations" factsheet. NPS, Denali National Park and Preserve, Denali Park, Alaska.

Owen, P.A. and T.J. Meier. 2009. 2008 Aerial Moose Survey, Denali National Park and Preserve. National Park Service, Denali Park, Alaska.

Phillips, L.M., B. Borg and M.L. Snover. 2012. Assessment of vehicle use and wildlife sightings in Denali National Park: Summary report 2006-2009. In press as an NPS

Technical Memorandum and available here: http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm

Phillips, L.M., P. Hooge, and T. Meier. 2010. An integrated study of road capacity at Denali National Park. Park Science 27:28-32.

Phillips, L., R. Mace, and T. Meier. 2010. Assessing the impacts of traffic on large mammals in Denali National Park and Preserve. Park Science 27:42-47.

Prato, T. 2008. Adaptive management for natural parks: consideration for an experimental approach. Park Science 25: online (http://www.nature.nps.gov/ParkScience/index.cfm?ArticleID=220&Page=1)

Putera, J.A., and J.A. Keay. 1998. Final report. Effect of vehicle traffic on Dall sheep migration in Denali National Park, Alaska. U.S. Geological Survey, Biological Resources Division, Denali Park, Alaska, USA.

Singer, F.C., and J.B. Beattie. 1986. The controlled traffic system and associated wildlife responses in Denali National Park. Arctic 39:195-203.

Smith, E. 2002. BACI design. In: El-Shaarawi, H. and W.W. Piegorsch, Eds. Encyclopedia of Environmetrics. John Wiley & Sons, Ltd. Chichester.

Tracy, D.M. 1977. Reaction of wildlife to human activity along Mount McKinley National Park road. Thesis, University of Alaska, Fairbanks, Alaska, USA.

Underwood, A.J. 1994. On beyond BACI: sampling designs that might reliably detect environmental disturbances. Ecological Applications 4: 3-1

APPENDIX D: TRAFFIC MODEL RESULTS

APPENDIX D:

Comparing numbers of buses on the Denali Park Road between the Alternatives

The purpose of this appendix is to

1) Briefly summarize the results of the traffic simulation model where bus schedules were developed and tested to meet the standards of the Tier 1 indicators. The full report is available here (Morris et al. 2011, http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm).
2) Discuss the source of information for a daily maximum number of vehicles for Alternative D
3) Extrapolate the traffic model results for the daily number of buses across the season to compare seasonal bus numbers and seat availability between and among the no action and action alternatives.

Introduction

Since 2006, Denali National Park and Preserve has been conducting a series of scientific studies to better understand the relationships between traffic patterns on the park road and the physical, biological and social environment. Collectively called the Road Capacity Study, the purpose has been to provide scientific support for park road traffic levels that would not impede wildlife populations along the park road corridor (Phillips et al. 2010) and would maintain visitor satisfaction (Manning and Hallo 2010). These studies have lead to the development of an approach to the adaptive management strategy that includes **7** measurable indicators with associated standards and a comprehensive monitoring program to ensure that any changes in traffic are not having a negative impact on resources and to ensure compliance with the standards and (Appendix C). Six of the indicators with associated quantitative standards are designed primarily to regulate the numbers of vehicles on the park road in such a way that natural resources are protected and the visitor experience is preserved. The indicators that impact the number of concessioner buses allowed on the park road are **1**) number of vehicles at a wildlife stop, **2**) number of vehicles at rest stops and the Eielson Visitor Center, **3**) number of vehicles in established viewscapes, **4**) gaps in traffic at Dall sheep crossing locations. Furthermore, two indicators limit traffic that has been shown to negatively impact wildlife sightings: **5**) large vehicle (contractor) traffic and **6**) hourly nighttime traffic. One additional indicator, **7**) hiker wait times, does not limit traffic volume but is designed to ensure adequate visitor access via the transit system.

A part of the Road Capacity Study involved equipping all concessioner buses and many other vehicles traveling the park road with GPS units to collect detailed information on their movement. From these data, a micro-simulation model was developed that would enable the park to test how different schedules may meet the standards set for the indicators (Morris et al. 2010). As outlined in Appendix C, any proposed traffic volume or schedule would be first tested in this model and adjusted such that, based on simulations, it appears to meet the standards.

The traffic simulation model was used to test sample schedules for Action Alternatives B and C, based on their descriptions of service offerings in Chapter 2 of this EIS, for compliance with the standards set for following indicators: 1) number of vehicles at a wildlife stop, 2) number of vehicles at rest stops and the Eielson Visitor Center, 3) number of vehicles in established viewsheds, 4) gaps in traffic at Dall sheep crossing locations. The NPS Preferred Alternative D has a bus system that is the same as B and therefore the model results from Alternative B apply to Alternative D. Alternative D, however, introduces the concept of a daily cap in the number of vehicles.

Traffic Model

The Minnesota Traffic Observatory (MTO) was contracted to develop and run a traffic model capable of testing bus schedules for compliance with the standards for the number of vehicles at a wildlife stop, number of vehicles at a rest stop, number of vehicles visible in viewsheds, and preservation of a gap in traffic at known or historic sheep migration corridors. Their baseline model included daily traffic levels that would be allowed or would be typical under the no-action Alternative A: 89 concessioner buses, 10 lodge buses including both day trips and overnight trips to inholdings, and 50 'other' vehicles including Teklanika campers, NPS administrative use, inholder right-of-way, etc, for a total of 149 vehicles. Additional schedules were tested that increased the number of concessioner buses in 5% increments to model how these increases would impact compliance with the standards (lodge bus and 'other' vehicles were held constant at 10 and 50 respectively). Results of these model runs demonstrate how the indicators and associated standards interact to limit traffic along the park road (Figs 1-3).

Limitations of the Model

A limitation of the model is how non-bus vehicles are handled and the restrictions on these vehicles proposed in Alternative B, such as eliminating Recreational Vehicle camping at Teklanika, could not be incorporated into the model. Hence the numbers above are initial estimates and it is possible that a more optimized schedule can be achieved that would allow for additional concessioner buses. It is also possible that the traffic levels listed above may not

achieve the standards once the schedule is run in reality, potentially resulting in fewer concessioner buses.

Results for Alternative B/D

For all alternatives, increases in concessioner buses above baseline resulted in a lack of compliance with the standards for vehicles at a wildlife stop and sheep gaps. For Alternatives B and D, while viewsheds showed little change in compliance until concessioner bus numbers were increased by more than 30% (Fig. 1), sheep gap (Fig. 2) and number of vehicles at a wildlife stop (Fig. 3) showed rapid declines in compliance with increasing traffic levels. It was found that the 'baseline' schedule representative of the daily maximum number of concessioner buses allowed under current management was not likely to meet the standards, and two concessioner buses had to be removed from the schedule before reasonable compliance was found (total of 147 vehicles past savage from 6 am to 10 pm).

Specifically, model results for the sheep gap spacing indicator highlight how increasing traffic levels result in loss of compliance in meeting this standard along the road (Fig. 2). Mile 21.6 showed the least amount of compliance with this standard with increasing traffic levels, and generally vehicle levels above 147 during the day (160 including nighttime vehicles, see below) would not allow for compliance with this standard. At this vehicle level, the other sheep gap locations that would be monitored generally met the standard, though care would need to be taken at Miles 37.6 and 60.6. Based on the traffic model results, Mile 68.5 had 10 minute gaps in traffic every hour. It is unlikely that the standard for this indicator can be met at all locations with traffic levels above 147 vehicles per day from 6 am to 10 pm and 160 vehicles per day inclusive of night-time traffic.

Modelers had a difficult time finding a schedule that would meet the standards for the vehicles at a wildlife stop in wildlife viewing subzone 2 (Fig. 3), although only a few schedules could be tested. Traffic model results indicate that the standard in subzone 1 can be readily met at traffic levels of 147 daytime, 160 inclusive of nighttime, traffic. However, from the model results, there may be difficulty in running even this level of traffic and meeting standards in subzone 2. Wildlife viewing in subzone 2 would need to be monitored closely if traffic levels approach the maximum daily limit proposed in Alternative D.

For Alternatives B and D, a schedule was found that the model output indicated may meet the standards for all of the indicators listed above. This schedule had 87 concessioner buses departing from the Savage Check Station per day, with 30 short tours (with a destination of the Teklanika rest stop), 22 long tours (seven with a destination of the Toklat rest stop, 13 with a destination of the Eielson Visitor Center, and 2 with a destination of Kantishna), and 35

VTS/camper buses (with destinations of Teklanika Rest Stop, Toklat Rest Stop, Eielson Visitor Center, Wonder Lake Campground and Kantishna). In addition, the schedule contained 10 lodge buses (transporting both overnight and day guests) and 50 'other' vehicles.

Results for Alternative C

For Alternative C, a schedule was found that the model output indicated may meet standards for all of the indicators listed above. This schedule had 85 concessioner buses departing from the Savage Check Stations per day, with 43 premium tours (24 with destinations to the Teklanika rest stop, 5 with destinations to the Toklat rest stop, 12 with destinations to the Eielson Visitor Center, and 2 with destinations to Kantishna), four specialty tours with destinations of either Toklat rest stop or the Eielson Visitor Center, 16 economy tours with destinations of either the Teklanika rest stop or the Eielson Visitor Center, and 22 VTS/camper buses. The VTS buses only went as far as the Eielson Visitor Center, and a loop shuttle was incorporated into the model to provide transit access as far as Kantishna. In addition, the schedule contained 10 lodge buses (transporting both overnight and day guests) and 50 'other' vehicles.

Daily cap on numbers of vehicles for Alternative D

Day time traffic (6 am to 10 pm)

While further refinement of schedules for compliance with indicators is not feasible at this time, park management recognizes that a schedule containing more vehicles than the *minimum* number tested by the model (147) is **unlikely** to meet the standards. Therefore management sees this as a maximum for vehicles passing through the Savage Check Station from 6 am to 10 pm. Based on the schedules, most concessioner buses are out of the restricted section of the park road before 10 pm, the latest departure time in the test schedule was a transit bus to Toklat departing the Wilderness Access Center at 5:50 pm.

Night time traffic standard (10 pm to 6 am)

Analysis of night time traffic demonstrated a significant reduction in morning wildlife sightings after nights with high hourly volumes of traffic that corresponded with construction projects. This led to a tentative night-time traffic indicator with the following standard: 95% of the time there will be an average of 3 vehicles or fewer per hour (total westbound and eastbound) passing any of the traffic counters west of Savage between 10 pm and 6 am, with never more than 6 vehicles in any one hour.

The daily limit does not imply a specific limit passing westbound through the Savage check station as, based on the standard, 24 vehicles may pass the traffic counter at Savage westbound and eastbound between 10 pm and 6am. We conservatively estimate that approximately 13 vehicles would travel westbound through the Savage check station.

160 vehicles

Under the NPS Preferred Alternative D, as in Alternatives B and C, actual traffic numbers traveling the restricted section of the Denali park road daily or seasonally will be controlled by a set of discrete, measureable indicators and associated standards. These indicators were chosen as key components to protecting park resources and preserving a high quality visitor experience and the associated standards were set to maintain or improve conditions under the current management plan. Unique to the NPS Preferred Alternative D is a proposal for a daily cap of no more than 160 vehicles passing westbound through the Savage Check Station in a 24 hour period with no more than 24 at night. This value stems from results of the traffic model combined with management's desired condition for night-time traffic and represents a high value that is unlikely to be realized given the restrictions of the indicators and associated standards, and serves as affirmation that operating under the indicator and standards cannot result in unlimited growth on the park road.

160 vehicles per 24 hour period daily maximum was derived from modeling daytime traffic and utilizing existing night-time traffic levels. It was from these two components, 147 daytime vehicles and 13 night time vehicles that the 160 vehicles per day maximum was established. There will not be a specific allocation between daytime and nighttime vehicles, only that their respective standards will be met, and in meeting these standards, park management is confident that the proposed daily maximum will not be exceeded. There will also not be a specific allocation of the day-time traffic to concessioners and 'other' user groups. If visitor demand increases, management will use its toolbox to reduce other uses of the road in order to meet visitor demand, while still complying with the standards and the daily cap.

Comparison of Action Alternatives (B, C & D) with No Action (A)

For comparison, Denali's General Management Plan and subsequent amendments currently impose daily limits of 30 Tundra Wilderness Tours (TWT; destinations of either Toklat at Mile 54 or Stoney Overlook at Mile 62), 23 Denali Natural History Tours (DNHT; destination of Primrose at Mile 17) and 36 Visitor Transportation System buses (VTS; turn-around points at Toklat, Eielson Visitor Center, Wonder Lake and Kantishna). The current Kantishna Experience tour (KE) is falling under the VTS allocation. These limits result in a maximum of 89 concessioner bus trips on the road in any given day. The concessioner cannot run these volumes everyday

however as there are seasonal limits of 2089 TWT and 3394 VTS (plus 550 that falls under the Superintendent's Discretion and historically 400 have been allocated to the TWT). The DNHT has no seasonal limits. Table 1 details differences between current management and Alternative D. Table 2 highlights historic vehicle numbers on the park road.

Table 1. Comparison of daily and seasonal limits for vehicle use between current management (Alternative A) and Alternative D.

10, 512 seasonal vehicles	**NPS Preferred Alternative D**
Includes a portion of vehicle use. Not included: DNHT and tour support vehicles, contractor traffic.	Counts all vehicle use: transportation system and other vehicle use including short tours, tour support traffic and contractor traffic
Based on 1986 general management plan and 1997 general management plan amendment	Based on a schedule tested in the traffic model that met standards for desired conditions and the night-time traffic indicator that was based on finding no impacts to wildlife sightings (maximum of 160 vehicles over a 24 hour period)
Actual Seasonal Vehicle Use 10,512 TWT, Transit, Other (NPS, ProPhos, Tek Campers, etc.) 2,553 DNHT * DNHT support traffic (historic range 328 – 566 vehicles per year) * contractor traffic (historic range 182 – 2,204 vehicles per year) Total potential annual vehicles per year: 13,322 – 15,582 vehicles per 110 day season (121-141 typical daily range, however a maximum of 174 vehicles has been observed in a 24 hour period)	Potential Seasonal Vehicle Use based on daily limit and meeting standards for desired conditions 160 total vehicles in a 24 hour period for 110 days Theoretical potential: 17,600 vehicles per 110 day season, but this level could only be met if all standards are met and visitor demand increases substantially above current,
Seasonal limit on most vehicles passing Savage. Daily limits only apply to tours and transit.	Daily limit on all vehicle use to prevent high peak days observed in the past
Strict allocation of transportation services	Allows for flexible allocation of transportation services based on visitor demand, with the transit service having priority
No current mechanism for reducing vehicle use, especially for those vehicles that are not currently counted towards the seasonal allocation (contractors, short tours, short tour support)	Ability to reduce vehicle use if standards are exceeded

Table 2. Total vehicles past the Savage Check Station during the GMP season, the average daily number when the road is open to Kantishna, and maximum daily number of vehicles recorded.

Year	Total Vehicles past Savage	Average Vehicles past Savage from June 8	Observed daily maximum
2007	14904	140	174
2008	12390	116	146
2009	12250	112	144
2010	12678	117	144
2011	11716	108	144

Extrapolating Daily Bus Numbers to Seasonal Bus Numbers and Seating Capacity

Under the new adaptive management approach proposed in this EIS, Denali is proposing that the maximum number of concessioner buses that can be run on a given day while meeting the standards and while the full length of the park road is open be allowed, which would allow for an increase in concessioner buses over the current GMP limits (Table 3) even though the daily limits may actually be lower. Modified schedules would be run in the early part of the season as the road opens.

Due to weather, snow clearing operations and road condition, the park road is not open all the way to Kantishna for concessioner bus traffic during the entire GMP season. From the start of the season (the Saturday before Memorial day) to May 31, the road is only open to the Toklat rest stop, from June 1 to June 7 the road is open as far as the Eielson Visitor Center, and from June 8 to the end of the GMP season (the second Thursday after Labor Day) the road remains open to Kantishna (depending on the weather). Allowing partial schedules from the start of the GMP season to June 7, action Alternatives B,C and D result in similar levels of increases in seasonal numbers of buses (Table 3, Fig. 4).

Conclusions

These were only sample schedules used to test how well the two action alternatives could meet the standards for the proposed tier 1 indicators. Actual daily numbers and allocations between the services also are likely to change and will be based on visitor demand. Schedules were found with similar numbers of buses for each alternative that could meet these standards, although Alternatives B and D suggested slightly higher numbers of buses over Alternative C. This difference is magnified when actual seating capacity is compared between the two action alternatives. Given the description of services and increased comfort of Alternative C, the seating capacity for that alternative is considerable lower than that of Alternative B.

Literature Cited

Manning, R.E., and J.C. Hallo. 2010. The Denali park road experience: Indicators and standards of quality. Park Science 27:33-41.

Morris, T., J. Hourdos, M. Donat. 2011. Traffic simulation to evaluate road capacity for transportation alternatives on the Denali National Park road. (http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm)

Morris, T., J. Hourdos, M. Donat, and L. Phillips. 2010. Modeling traffic patterns in Denali National Park and Preserve to evaluate effects on visitor experience and wildlife. Park Science 27:48-57.

Phillips, L.M., P. Hooge, and T. Meier. 2010. An integrated study of road capacity at Denali National Park. Park Science 27:28-32.

Table 3. Current GMP seasonal limits (Alternative A) compared to Alternatives B, C and D given and average season length = 111 days, average season length to Eielson = 108 days, and an average season length to Kantishna = 101 days. These numbers are reflective of the full schedules (87 buses per day for Alternative B and D, and 85 buses per day for Alternative C) over 101 days and modified, reduced schedules for the 10 days prior to the road being open to Kantishna.

ALTERNATIVES B and D

Bus type	Alternative A seasonal allocation	Alternative B/D	% change
VTS (including Economy Tour)	3394	3714	9.4
Short tour (Tek)	2553 (DNHT)	3330	30.4
Long Tours	2589	2422	-6.5
		Overall change	+10.9%

ALTERNATIVE C

Bus type	Current seasonal allocation	Alternative C	% change
VTS	3394	2370	-30.2
Loops	N/A	909	N/A
Economy Tour	N/A	1770	22.0*
Tek Tour	2553 (DNHT)	2664	4.3
Other Premium Tours	2589	2530	-2.3
		Overall change	+9.3%‡

*If VTS and Economy Tours are combined

‡If Loops are not included

Table 4. Seating capacity: current GMP seasonal limits (Alternative A) compared to Alternatives B and C. These numbers are reflective of the following assumptions:

- In Alts A (except campers), B and D, all buses () have a 52 seat capacity, 44 if wheel chair accessible[‡]
- For Alt C, the premium tours will have more leg room, and thus only a 48 seat capacity, 40 if wheel chair accessible
- Camper buses for Alternatives A and C have a 28 seat capacity
- For Alts B & D, assume every camper needs two seats, 7% of VTS riders are campers.
- 50% of all VTS and Economy tour buses (except campers) are wheel chair accessible (all alternatives)
- 10% of all premium tour buses are wheel chair accessible (all alternatives)
- Occupancy rate on the VTS/campers for Alts A, B and D is 70% (includes double seats for campers in B and D)
- Occupancy rate on the VTS/campers for Alt C is 50%
- Occupancy rate on all tours is 100%

ALTERNATIVE B/D

Bus type	Alt A seat capacity	Alt B/D Seat capacity	% change
VTS	102432	116055	13.3
Short tour (Tek)	130714 (DNHT)	170496	30.4
Long Tours	132608	124006	-6.5
		Overall change	+12.2%

ALTERNATIVE C

Bus type	Alt A seat capacity	Alt C Seat capacity	% change
VTS	102432	52175	-49.1
Economy Tour	N/A	84960	33.9[*]
Tek Tour	130714 (DNHT)	125741	-3.8
Other Premium Tours	132608	119416	-9.9

	Overall change	+4.5%

‡ As of 2011, 52 passenger buses will be able to travel to Kantishna, previously the road standards limited the size of the buses to 44 passenger buses. The numbers presented here are comparing Alternatives B and C to Alternative A (using the current GMP seasonal limits and the new bus seating capacity numbers) and not necessarily what the 'current', pre 2011 condition was.

* If VTS and Economy Tours are combined, does not include loops.

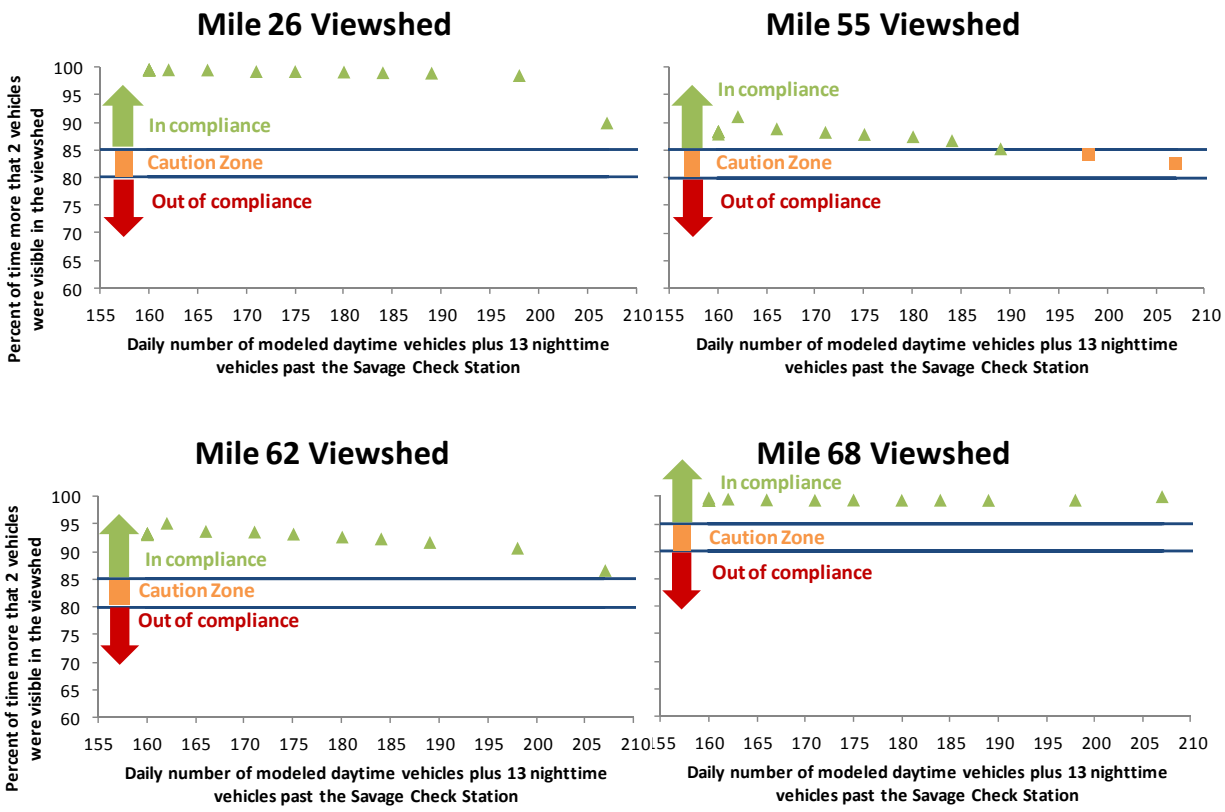
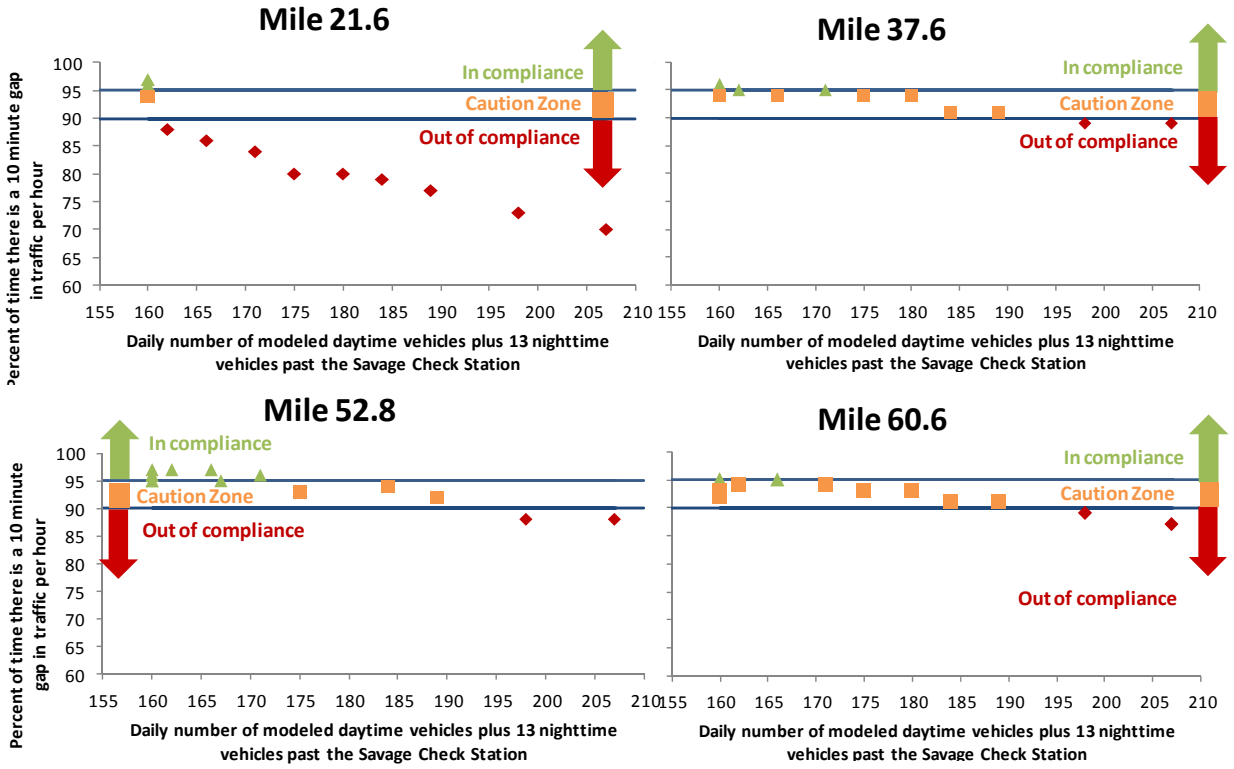


Figure 1. Traffic model results for the viewshed indicator. The standards for the viewshed indicator vary depending on the wildlife viewing subzone: at least 85% of the time during bus operation hours, there will be 3 or fewer vehicles visible in the Mile 26 viewshed in subzone 1, and 2 or fewer vehicles visible at one time in the Miles 55 and 62 viewsheds in subzone 2, all averaged over 5 years; and no one year will have more than those values less that 80% of the time during bus operation hours. In subzone 3 (Mile 68 viewshed), the standard states that at least 95% of the time there will be 2 or fewer vehicles visible in the viewshed, averaged over 5 years, and no one year will have less than 90%. There are further restrictions to ensure that the other 25% of stops do not have excessive numbers of vehicles (see Table 2 in Appendix C). Model results for this indicator show these levels depicted with the arrows and color of the datapoints. All datapoints above 85% (in green) are in compliance. Orange datapoints, if the value occurred in one or two years, would not be out of compliance, but are a warning for management that conditions need to be improved in subsequent years in order to meet the 5 year average requirement of the standard (caution zone). Any red data points indicate a lack of compliance with the standard.



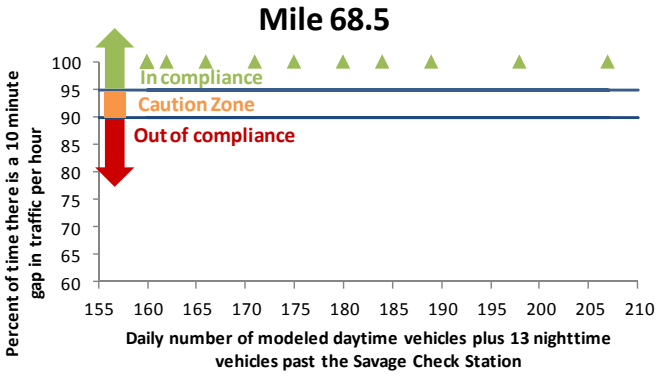
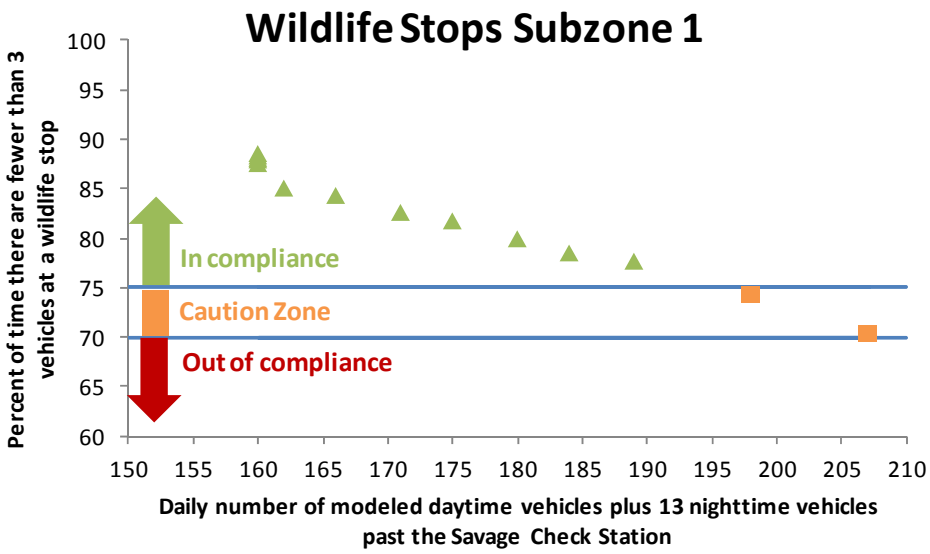


Figure 2. Traffic model results for the sheep gap indicator. The sheep gap spacing indicator states that Milepoints 21.6, 37.6, 52.8, 60.6, and 68.5 will have at least a 10 minute gap in traffic every hour 95% of the time (23 of 24 hours) averaged over 5 years; and that no one year will have gaps less than 90% of the time (22 of 24 hours). Model results for this indicator show these levels depicted with the arrows and color of the datapoints. All datapoints above 95% (in green) are in compliance. Orange datapoints, if the value occurred in one or two years, would not be out of compliance, but are a warning for management that conditions need to be improved in subsequent years in order to meet the 5 year average requirement of the standard (caution zone). Any red data points indicate a lack of compliance with the standard.



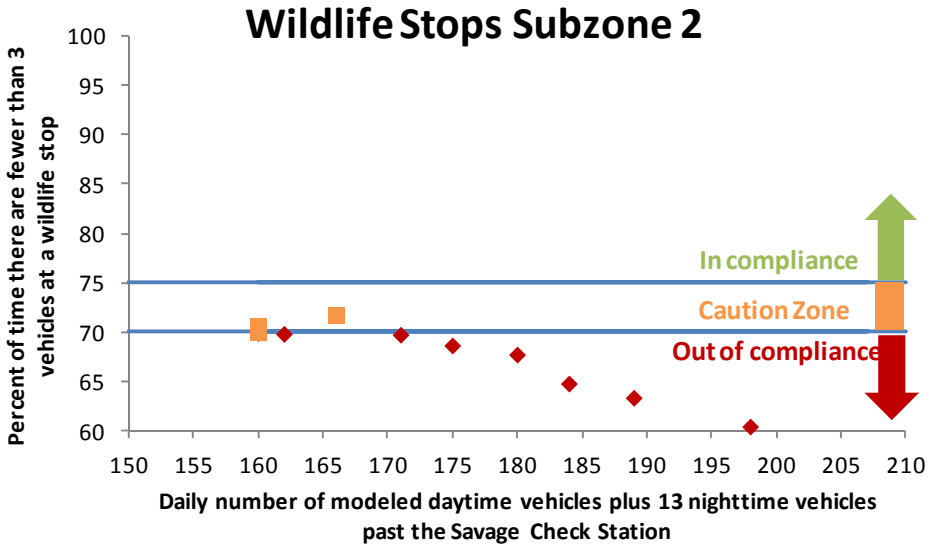
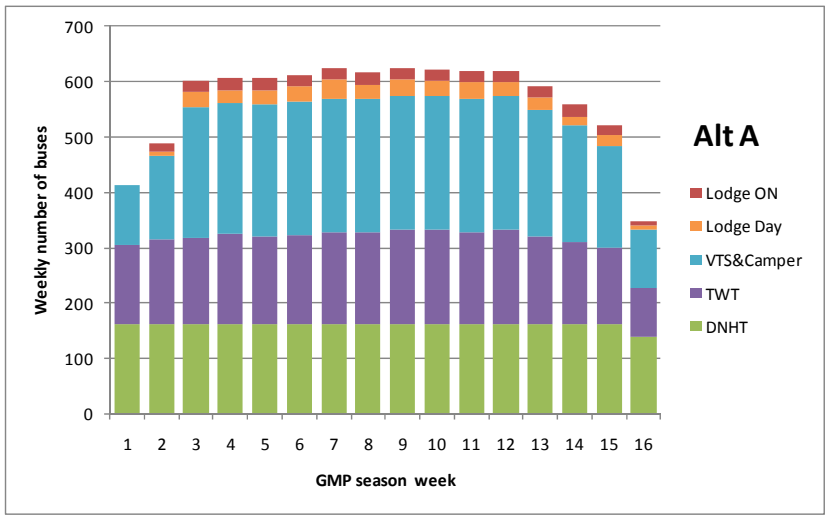
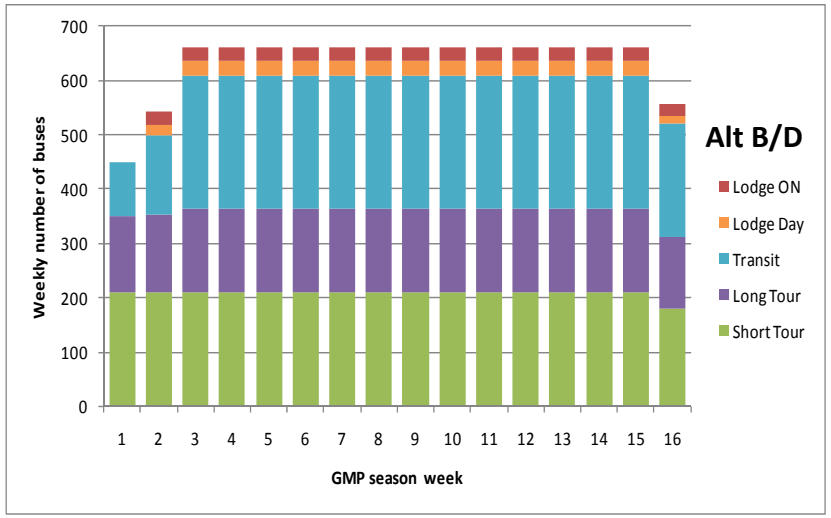


Figure 3. Traffic model results for the wildlife stop indicator. The standard for the wildlife stop indicator varies depending on the wildlife viewing subzone: at least 75% of stops will have 3 or fewer vehicles in subzone 1, 2 or fewer vehicles in subzone 2 and 1 vehicle in subzone 3 averaged over 5 years; and that no one year will have less that 70% of stops with those values. There are further restrictions to ensure that the other 25% of stops do not have excessive numbers of vehicles (see Table x). Model results for this indicator show these levels depicted with the arrows and color of the datapoints. All datapoints above 75% (in green) are in compliance. Orange datapoints, if the value occurred in one or two years, would not be out of compliance, but are a warning for management that conditions need to be improved in subsequent years in order to meet the 5 year average requirement of the standard (caution zone). Any red data points indicate a lack of compliance with the standard.





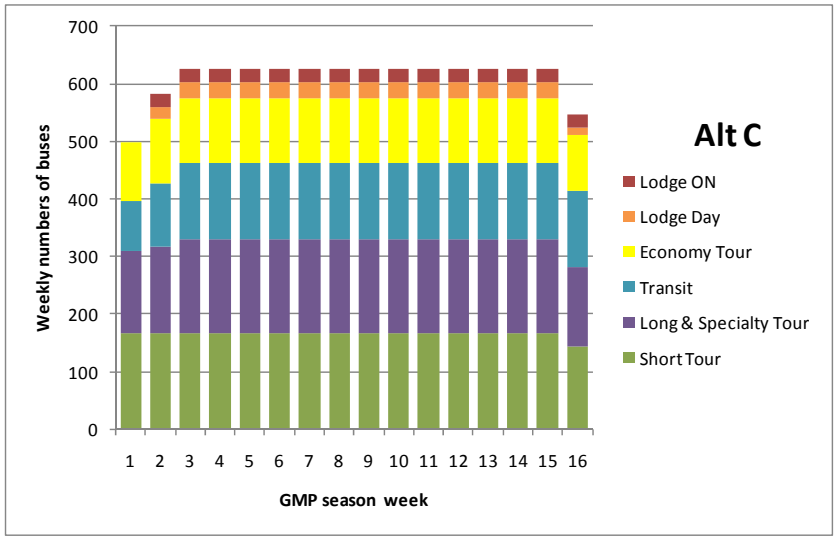


Figure 4. Distribution of buses on the Denali park road across the season for each alternative. The GMP season dates of 2007 were used as an example, and week 16 only had 6 days in it which accounts for the drop in numbers for that week in Alternatives B/D and C. For Alternative A, 23 DNHT buses were run each day. A typical seasonal distribution of TWT buses was used in Alternative A, similar to what was run in 2007, totaling the full potential possible for buses under the no action alternative (2089 + 400).

APPENDIX E: LETTERS FROM AGENCIES AND ORGANIZATIONS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

September 22, 2011

Miriam Valentine
Denali Park Planning
Denali National Park and Preserve
PO Box 9
Denali Park, Alaska 99755

Re: Comments on the Draft EIS for the Denali National Park Vehicle Management Plan, EPA Project #08-050-NPS.

Dear Ms. Valentine:

We have reviewed the National Park Service (NPS) draft environmental impact statement (EIS) for the Denali National Park and Preserve (DNPP) Vehicle Management Plan. Our review was conducted in accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act. Based on our review, we have assigned a rating of LO (Lack of Objections). For your reference, a copy of the rating system we used to conduct our review is enclosed.

We believe that the draft EIS does a satisfactory job of analyzing a reasonable range of alternatives for vehicle management, as well as the impacts associated with the alternatives. We appreciate the NPS's consideration of the visitor experience in addition to the traditional impacts to environmental resources. While we believe and agree with the NPS that both Alternative B and Alternative C are environmentally preferable, we also recognize that Alternative C provides greater types of visitor opportunities, thus enhancing the public's appreciation of DNPP resources, which can have additional benefits. Alternative C may also provide more opportunities to lower income and disabled visitors. We fully support the adaptive management strategy identified in the draft EIS and believe that the flexibility provided by that strategy will enable the NPS to minimize impacts while enhancing visitor experience for many years to come.

Thank you for the opportunity to review this draft EIS. If you have questions about our comments, please contact me at (206) 553-1601 or by electronic mail at Reichgott.christine@epa.gov, or you may contact Jennifer Curtis of my staff in Anchorage at (907) 271-6324 or curtis.jennifer@epa.gov.

Sincerely,

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure

Printed on Recycled Paper

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Denali Park Planning
Denali National Park and Preserve
P.O. Box 9
Denali Park, AK 99755

Sept. 30, 2011

Dear Planners,

Please accept this letter as comment by the Alaska Quiet Rights Coalition (AQRC) on the Denali Park Road Draft Vehicle Management Plan and EIS.

AQRC is a statewide non-profit organization dedicated to protecting the rights of Alaskans to quiet places for the benefit of public land users, home and cabin owners, communities, businesses, wildlife, visitors, and future generations. We believe that natural quiet and natural sounds should be recognized by public land managers as critical resources to be protected just as any other natural resources such as wildlife and their habitat are protected. Natural quiet is an essential component of wild habitat.

Denali National Park is the premier National Park in Alaska and perhaps the nation. It should represent the best in resource management that our nation has to offer. We believe that protection of the resource must supersede visitor interest and desires because visitor demands will always increase whereas the resource is finite. We want our great grandchildren to have DNP as it is, even if (especially if) they have to stand in line to appreciate it. AQRC supports efforts to control visitor noise and impacts on wildlife, wherever possible.

1). For that reason, AQRC believes that the 10,512 numerical vehicle limit is essential regardless of what elements of the alternatives are adopted. Although there are many good ideas in the Plan, safeguards against political and corporate pressures are dangerously weakened without a numerical limit. Today's park administration cannot guarantee the responses of tomorrow's administration to the enormous pressures they will have to face from commercial giants and politicians with alternate visions of park use.

2) The possibility of quiet electric buses and trains should continue to be explored.

3) Keep it simple. The proposed alternatives are time and money intensive. In today's economy, NP funds should continue to be used for habitat protection and study. A complicated road vehicle plan is doomed to eventually drain funds from backcountry protection.

Thank you for your work in protecting our National Park and for this opportunity to comment.

Elizabeth Hatton
Member of the Board of Directors of the Alaska Quiet Rights Coalition
libbyh@alaska.net

8601 Sultana Drive
Anchorage AK 99516

STATE OF ALASKA

SEAN PARNELL, Governor

ANILCA IMPLEMENTATION PROGRAM
Office of Project Management and Permitting

550 W. 7TH AVENUE, SUITE 1430
ANCHORAGE, ALASKA 99501
PH: (907) 269-7529 / FAX: (907) 334-2509
susan.magee@alaska.gov

October 27, 2011

Paul Anderson, Superintendent
Denali National Park and Preserve
P.O. Box 588
Talkeetna, AK 99676

Dear Mr. Anderson:

The State of Alaska reviewed the Draft Denali Park Road Vehicle Management Plan and Environmental Impact Statement (DEIS). The following comments represent the consolidated views of the State's resource agencies.

The State appreciates the Service's efforts to anticipate and plan for increased visitation within the Park. While the Park Road vehicle limit of 10,512, established in the 1986 General Management Plan, has accommodated visitor use thus far, the number is largely arbitrary. We therefore also appreciate the objective to establish a science-based approach to vehicle management. Based on conversations with Park staff, it appears that the Service believes it will be able to increase overall access along the road while maintaining or improving visitor experience and protecting park resources. Unfortunately, this conclusion is not particularly obvious in the DEIS and we recommend additional explanation in the final EIS.

Based on our observations of the Denali Backcountry Plan, which also relies on a science-based approach, use of standards and indicators sometimes proves challenging. Unforeseen issues may arise during implementation, especially as visitation increases over time. We anticipate we will work with the Service on those and other routine implementation issues through the annual Compendium review process.

Tourism is one of Alaska's largest industries and Denali is a critical component to the State's tourism industry. The current transit system is well established and any changes that affect that system need to be carefully considered. For example, our understanding is a minimum of two years lead-time would be necessary for industry to respond to changes that result from monitoring efforts. We request the Service continue to work closely with tourism representatives on these issues to ensure the plan does not negatively affect the needs of this vital industry.

As you know, the State has a long-standing interest in both Kantishna and ensuring inholder access rights under ANILCA Section 1110(b) are honored on a statewide basis.

We support the continued viability of the lodges at Kantishna, which add a uniquely Alaskan dimension to the range of park experiences. While we agree with the plain statement on page 46 that "*Conducting commercial activity in the park outside the boundary of the inholding is not provided by Section 1110(b),*" the established pattern of private day tours provided by some of the Kantishna-based lodges has evolved over the years and is not necessarily cleanly outside the scope of ANILCA Section 1110(b) by virtue of recent history. The Service has openly accommodated this use for many years under the ANILCA inholder access provision and the resulting business model for some of these remote lodges appears dependent on this day use.

We therefore appreciate that the draft plan provides alternatives to continue day trips to Kantishna. The benefits of allowing this day use under one or more commercial use or concession operations could be substantial for all parties, including the ability to increase Kantishna day use. The resulting ability to coordinate the departure times with other bus trips could also reduce congestion and improve the experience of all passengers. We also appreciate that the Park has made a considerable effort to reach out to the affected lodge owners for solutions and we encourage these parties to work out an effective and mutually beneficial strategy.

We request the Service also carefully consider the likelihood that inholders would be successful in obtaining a concessions contract through the competitive bidding process. If there is a chance that the competitive process may eliminate the opportunity for inholders, we recommend instead permitting day tours with a commercial use authorization. The State supports a long-term solution that, at a minimum, provides inholders with continued levels of Kantishna day use.

Page-specific Comments

Pages 28-29, Park Road Motor Vehicle Permits: The DEIS does not specify how the regulation would be revised under Alternative B or C. We request the final plan clarify how the seasonal vehicle allowance would be accounted for under adaptive management as compared to the current numerical limit.

Page 46, Actions Common to All Alternatives: We recommend that the final plan further clarify the intended distinction between day use for Kantishna lodges and access for "*overnight guests and travel necessary for operation of the inholding*." In light of Alternatives B and C that would manage Kantishna day use as a commercial visitor use, an understanding of the basis for this distinction is important.

Pages 183-187, Transportation System and Traffic (Environmental Consequences): The only reference to Kantishna inholder access in this discussion is on page 184 regarding Alternative B. As with the page-specific comment for page 46, this reference should clarify what type of use "*may be reallocated*." There is no reference to inholder access in the analysis for Alternative C. The final document needs to avoid the implication that the Park may arbitrarily take away "*adequate and feasible access*" under Section 1110(b) to benefit recreational visitors.

Thank you for this opportunity to comment. Please contact me at (907) 269-7529 if you have any questions.

Sincerely,



Susan Magee
ANILCA Program Coordinator

cc: Miriam Valentine, Denali Park Planner

Denali Citizens Council
Serving to protect Denali National Park and environs
PO Box 78 Denali Park, Alaska 99755 907-683-3396 www.denalicitizens.org

October 30, 2011

Superintendent Paul Anderson
Denali National Park and Preserve Planning Team
PO Box 9
Denali National Park, Alaska 99755
SENT BY EMAIL TO Dena_Planning@nps.gov

Dear Superintendent Anderson,

Thank you for the opportunity to submit comments from the Denali Citizens Council on the Draft Denali Park Road Vehicle Management Plan and Environmental Impact Statement. The Denali Citizens Council, founded in Cantwell in 1974, is composed of more than 330 local, regional and nationwide stakeholders and park supporters. Our members have a unique perspective on Denali issues. Many live or have lived and worked in the park or Denali gateway communities. They understand from a personal perspective the implications of park policies and actions. We note that this plan has garnered an unusually passionate and interested set of responses.

Before addressing components of the plan in depth, first we must say that those who have contacted us regarding the plan overwhelmingly favor Alternative A – No Action. There is great mistrust of adaptive management as a substitute for regulatory limits on the park road. The mistrust seems to emanate from four distinct concerns: 1) a concern that NPS will lack the capacity to implement the research program; 2) a concern that the plan requires unattainable or undesirable vehicle movements and/or bus driver participation; 3) a fear that NPS will manipulate the complex research program and indicator/standard results to reach its own favored policies of the moment; and 4) a fear that annual reconsideration of limits will be much more subject to outside political pressure and manipulation than a clear, stable regulatory standard.

These are valid concerns which NPS must recognize and address. We will add one more to the list for context: to change an established regulatory limit NPS needs to provide the public with something that is as readily transparent and easily understood. The adaptive management scheme presented in the plan is the antithesis – it is complicated, multi-layered, and even linguistically tortured. The public at large cannot see the whole picture of what you are trying to accomplish.

This is not sufficient. At present, we have a clearly stated capacity definition for the park road. If we are going to give it up, we want an equally clear capacity that can be readily understood by the public and readily compared to the existing capacity. Otherwise, NPS is going to find it has little legitimacy when it needs to enforce its standards, and the process could become mired in controversy.

DCC Board

Nancy Bale
Anne Beaulaurier
Barbara Brease
Nan Eagleson
Charlie Loeb
JJ Neville
Hannah Ragland
Jared Zimmerman

Julia Potter, Community Organizer

The research accomplished to inform this plan is unprecedented in its scope and we should use that knowledge to truly strengthen the capacity limit on the park road through a new consensus on what that capacity should be. This plan does the opposite – tearing down a well-accepted limit and replacing it with a process that the public does not understand well enough to defend.

In addition, NPS has provided inadequate information as to whether the current capacity limit of 10,512 is not already creating degradation of park resources and creating a situation where NPS must upgrade and change the existing landscape in order to accommodate it.

DCC's comments will reflect the concerns of our constituents gathered from meetings, emails and personal communications. Our board of directors has also reviewed these comments. As an organization with a strong vision for the future of the Denali area, our bottom line is reflected in the following points:

- Protection of the character of the road, the wildlife, and wildlife viewing opportunities is paramount.
- A viable, affordable, and enjoyable transit system is important for the long-term viability of the entire transportation system.
- The most important part of the plan is the determination and allocation of capacity. Capacity determinations for the park road need to be readily comprehensible and enforceable.
- The plan must be comfortably within NPS's capacity to implement.

Several concepts in this plan are appropriate and needed, and reflect a good faith effort to listen during scoping activities over the past several years. We thank NPS for them. However, we have a number of suggestions for improvement of the Draft Plan. Please accept the comments below as our sincere effort to analyze this NEPA document fully and accurately.

I. A new EIS-level plan on road management may not be required.

A transportation planning process was completed fairly recently, in 1997, in the Entrance Area and Road Corridor Environmental Impact Statement (ROD, February 1997) intended to provide guidance to the National Park Service for the next 15-20 years (approximately 2017). Its intended lifespan has yet to be reached. The implementation of all its provisions is ongoing, including a number of implementation EAs. Some changes have been made, but the general policy intent and overall validity of this plan are not in question.

We therefore question why proposed changes in road management require a new, EIS-level plan **and** include major policy changes moving away from this well-vetted plan. We ask:

a. What provisions of the 1997 plan have become deficient or in need of changing with EIS level work?
b. If after careful consideration in 1997, NPS determined that the park road capacity limit of 10,512 was appropriate, what has changed? NPS knew then that it was not "scientific" in a strict sense. NPS also knew, then, that tourism pressures were growing and urged private developers to use discretion in their build-out of properties adjacent to the park, bringing visitors to the entrance of the park without the capacity to accommodate them in the more protected wilderness core park.

c. If, as in the 1997 plan, NPS deemed it appropriate to put a road capacity number into federal regulation, why would NPS now decide this is no longer necessary or advisable? The Final 1997 plan established some allocation parameters for tour v. shuttle/transit v. private vehicles. These were not put into regulation and can be changed through an EA process. We do not oppose, outright, some changes in scheduling and tour allocations, as long as resources and well-settled policy directives are maintained.
d. The 1997 plan, correctly, **paired** road management policy with infrastructure policy along the entire Park Development Zone, i.e. the road corridor. That approach was appropriate and valid, from the standpoint of a comprehensive setting and evaluation of desired future conditions. The current plan claims that no infrastructure changes would be required for implementation, yet alternatives self-evidently increase traffic to Teklanika Rest Stop and perhaps to Eielson Visitor Center without an analysis of impacts. We (and our members) wonder if NPS has fully thought this through.
e. The 1997 plan pledged to develop a VERP program, managing for "desired future conditions," and even presaged some of the indicators proposed in this program. The mandate for VERP, or adaptive management, stems from the 1997 plan, and the current Road Capacity Study, begun in 2006, can be considered an implementation of that mandate. The current plan is not unique or original in its advocacy of VERP. Additionally, there is nothing in the 1997 plan to indicate that VERP cannot be conducted within the context of a regulatory limit on vehicle access.

2. NPS has not given, in its Purpose & Need analysis on page iii-iv, a compelling reason for the specific changes advocated in this plan.

a. The plan states, "The purpose of the proposed National Park Service action is to improve the management of vehicles along the 92 mile long Denali Park Road," however the plan has not given specific information on how the current management requires improving, or how this change might simply take place in the context of the 1997 plan with EA-level implementations. NPS has not proved that the current bus management system has pervasive and important flaws that require a revolutionary new way to manage.
b. The Draft VMP states that "trends indicate that visitation to Alaska and the Denali area will continue to increase," as a defense for a re-examination of capacity determination, with an eye to increasing it. However this plan has not shown that there is any problem with increased visitation trends in the foreseeable future. Even if there were, NPS is not **obligated** to accede to new demand, after having spent several years building out the entrance area of the park with activities designed to provide a variety of services to meet that demand, and enlarging capacity along the park road consistent with the existing traffic limits. The strategy articulated in the 1997 Entrance Area and South Side plans for accommodating increased visitation was to provide facilities and programs in the Entrance Area and South Denali so that there was no need to increase traffic on the park road. Almost all of the entrance area facilities have been completed, but there is no explicit analysis as to whether it is working as expected.
c. We know, from history, that vehicle use at Denali has approached the 10,512 cap during some years, and would have exceeded it if the DNHT were included in the actual allocation. This fact does not lead, however, to the inevitable conclusion that the 10,512 cap is no longer viable. Recent economic changes across the country have changed visitation patterns, and this change could be long term or even permanent.

d. In addition, before any upward change in capacity is proposed, NPS is obligated to show that the current park road use levels are not degrading park resources. The Draft Plan should provide more detail in showing this.
e. The Draft VMP states that the current vehicle limit "was not attached to more refined desired conditions in a logical framework that could be measured and monitored over time." That may be true but it **does not follow** that NPS **must abandon** a vehicle limit in order to employ new monitoring and vehicle management strategies. We do not oppose the general concept of VERP, or Adaptive Management, as a research strategy.
f. Use of VERP (or Adaptive Management) to monitor whether new destinations and scheduling options are protective of resources and visitor experiences is appropriate and could help with planning and avoidance of impairment. Using VERP as a trial and error system to manage a wholesale manipulation of vehicle numbers, with an eye to increasing traffic (by different amounts depending on the Action Alternative selected) is an inappropriate use of this process, considering its existing flaws and potential for manipulation (considered below).

3. Is the adaptive management scenario as presented this Draft Park Road Vehicle Management Plan adequately robust to protect park resources in the absence of a defined limit?

Our answer to this question is no. We are not necessarily opposed to changes in scheduling and allocation of buses, or to experimenting with new destinations for tour/transit, but only in the context of a regulatory limit. Information from the 2006-2010 Road Capacity Study can be used to establish a rough scheduling model and destination mix that will work well even within the 10,512 cap. The scheduling model could be adapted yearly, depending on what worked, what didn't. That NPS did not include an alternative that presents this option is a **deficiency** in this Draft Plan. We employ such an option in our suggested alternative, below.

The Draft VMP proposes adaptive management using indicators and standards as a more accurate, scientific method for determining vehicle capacity on the Denali Park road. It does seem sensible to use indicators and standards to set benchmarks for resource degradation and to use them as triggers for action to protect resources. The plan, however, will only be as accurate and scientific as the indicators/standards being employed. We have concerns about the science, as follows:

a. **The indicators most predominantly employed in capacity determination, Tier 1, are overly weighted toward the "visitor experience" metric.**
    i. Tier 1 indicators are all (except for "night time traffic levels" and "sheep gap spacing") based upon visitor experience studies. These Tier 1 indicators are not insignificant indicators, but they measure only the surveyed views of park visitors, not the broad health of the park ecosystem and soundscape, the structural capacity of the road itself or the adequacy and the safety and capacity of roadside infrastructure. All these things are measures of the health and capacity of the Denali Park road. Tier 2-4 indicators, although monitoring a wider range of natural resource-oriented indicators, will not be employed as regularly as Tier 1 in the actual plan deployment, as we understand it.

b. **Collection and monitoring of Tier 1 indicator data is subject to some problems with validity.**
   i. Tier 1 and Tier 2 indicators that utilize Denali Park drivers to input data carry with them a potential for validity challenges, related to the skill and willingness of individual data collectors, made more significant because of the large number of different individuals expected to input data.
   ii. The "sheep gap" indicator appears valid, but may have been given inappropriate weight by being applied over the entire season. On some of the park road locations mentioned, sheep cross the road at only certain times of the year, and providing a gap is not particularly necessary or protective at all times. Sheep on Polychrome have become somewhat habituated to the existing driving scheme, and appear at the roadside with little regard for the buses. Monitoring of special, seasonal crossing areas for sheep and control of traffic at those times, is already being done by NPS. Maintaining a gap between vehicles may be desirable on its own, but should not be couched as protection for sheep if it really isn't. We understand that drivers already make every effort to spread out between one another to provide their clients with the best possible experience.
   iii. NPS states that GPS equipment will be mounted on all NPS vehicles and on all concession buses, by contract. The plan does not indicate how it will accurately track other vehicles that regularly use the road (e.g. employees of Kantishna businesses, inholders, Toklat employees, contractors on long term assignment in the park), introducing the potential for misinterpretation of data.

c. **The standards, as listed in this Draft Plan, seem to be insufficiently responsive to damaging trends.**
   i. Five year averaging - Why is the assessment of desired standards based upon data that are averaged over five years? Although this averaging may serve to smooth out the data and eliminate insignificant variances, it could also create a situation where consistent near-violations at certain parts of the season are not given the significance they warrant. NPS should provide additional rationale for choosing five-year averaging.
   ii. The percentage violation of desired standards required to trigger action is inadequate in the Hiker Wait Time Standard. For more on this, see our discussion below.
   iii. Two season time lag – To change capacity numbers and scheduling models in response to indicator/standard data, NPS proposes to use the Superintendent's Compendium, but because of the time lag between generation of the number/scheduling model and publication in the Compendium, the new numbers each year will not be incorporated for two seasons. This time lag is curious in a system that purports to be flexible, accurate, scientific and responsive, and is unacceptable if indicators are exceeding **minimum standards**.
   iv. We are very concerned about the note at the end of Table 5 (p.80) that allows an indefinable "small percentage" of standard violations on top of the already-generous percentage exceedances written into the standards. This appears to allow NPS the latitude to simply ignore inconvenient standard violations rather than taking action to remedy the problem and ensure it won't happen again.

d. **Standards, in some cases, may not be adequately enforceable or easily achievable.**
   i. An indicator/standard should be employed in an adaptive management scheme only if management actions have some chance of success in enforcing it. We question, for example, how successfully the sheep gap spacing standard can be achieved, given the relatively random movement of buses and other vehicles, even if release times from headquarters are timed to include the gap.
   ii. In a scenario where additional tour/transit traffic is scheduled for Eielson Visitor Center, violation of the viewscape standard at Mile 62 (Stony) would be likely. We would advocate for **no change in numbers of bus traffic from Stony to Eielson,** and a minimal substitution of tour for transit, if NPS sends a tour to Eielson.

e. **Some indicators/standards are inadequate or missing.**
   i. For example, Hiker Wait Time, discussed later in these comments, is the only indicator that protects transit, and its 30-60 min wait time standard is weak. See the DCC solution in our proposed alternative, below.
   ii. The NPS method for measuring affordability of the transit system is flawed by being based on a survey of existing park users without taking into account the views of those who were turned away by the expense. See the DCC solution in our proposed alternative, below.
   iii. **Stony Hill** – there should be a "number of vehicles parked" standard for this overlook.
   iv. **Primrose** rest area – there should be a "number of vehicles parked" standard for this overlook.
   v. **Polychrome Overlook** – even without restrooms, the number of buses and people at this spectacular stop would seem to be a critical area for protecting the visitor experience – why is there no standard here?
   vi. With any Alternative that would change destinations from the current situation, specific limits should be identified for all parking areas that are created.

f. **Implementation of this entire monitoring, modeling and management strategy will experience a number of influences that are not entirely predictable**. **We have concerns about how this adaptive management strategy can remain clean, valid and protective over a 20 year time horizon.**
   i. Details of plan implementation will depend on exigencies associated with the concession contract, including negotiation of franchise fees (which are proposed to pay for the plan monitoring), purchase, installation and maintenance of hardware for the monitoring program, development of driver mandates and rules of the road, and a host of other elements, any one of which could significantly weaken elements of the AM scheme.
   ii. The actual crunching of the monitoring data to create a report on the health of the park road remains obscure in this Draft Plan. How much of the interpretation of the Tier 1 monitoring data will be left to discretion? If desired standards are violated during the first four years, but not minimum annual standards, will any action be taken, or will NPS wait for the fifth year averaging? How will NPS prioritize actions in its toolbox to address trends that have not risen to the level of impairment?

iii. We are concerned that over the years NPS may be unable to avoid a "drift" in the standards to numbers more favorable to growth. What about the addition of new standards? How will this complicate the modeling and interpretation of data?

iv. Affordability of the monitoring plan in declining federal budgets is a huge problem. Base funding will be required for additional staff, and this in an environment in which the park has been not fully staffed for some time. In addition, we question the long term priority this plan will have in allocation of franchise fees. We understand that elements of the park's resource stewardship strategy are funded by franchise fees, and fear that some park programming will suffer if the monitoring as specified in this plan is fully implemented for 20 years.

g. **Finally, can an adaptive management plan, because it must use numerically measurable indicators, incorporate the intangibles into decision making -** the full range of values and influences that constitute a healthy national park road, including the Murie vision for road character, the importance of minimizing infrastructure at road's edge, the mandate that this road be a narrow corridor through a wild and scenic land?

4. Neither Action Alternative in this plan is acceptable to DCC and its membership.

a. Alternatives B and C employ adaptive management without the context of a regulatory limit, which is unacceptable for reasons outlined above.

b. Both Action Alternatives offer ways to increase traffic on the Denali Park Road, but the park has not adequately, in our mind, proven that the existing traffic amounts are not damaging resources.

c. The range of action alternatives is not comprehensive enough. NPS has not offered an Action Alternative that maintains a regulatory limit, which could logically have been done. NPS should have, in addition, offered an Action Alternative that proposed **no increase** in road traffic but with some of the potentially productive actions proposed in the Draft Plan, as was described in Alternatives Considered but Dismissed.

d. Both Action Alternatives support the creation of a short tour to Teklanika without fully analyzing reasons for this change OR impacts of it.

e. **Some specific stipulations of each Action Alternative seem to be at odds with the protection of resources and visitor experience along the park road. In particular, we are concerned about the following:**

i. Alternative B –

- We oppose the use of larger buses on Wildlife Viewing Subzone 1 west of Savage as far as Teklanika.
- We do not support the "maximization of access" concept as stated in this alternative.
- We oppose attaching a reserved seat to self-guided economy tour. It is not necessary if transit is adequately protected by strong standards and creates a management complication for transit drivers.
- We oppose the picking up of hikers by premium tour as a regular practice.

- We oppose a "tents only" campground at Teklanika, and continue to support RV access within safe size parameters.

ii. Alternative C –

- We support the Management Zone concept in this alternative, with alterations as above, but would alter the description of Wildlife Viewing Subzone 3 (see below). We cannot have an opinion on the Special Use Zone between Kantishna and Wonder Lake unless more information is made available on why it exists.
- We support additional definitions and indicators to ensure Affordability and Priority of Transit – see detailed discussion below. We support the NPS obligation to maintain Transit as a demand-based system.
- We oppose having a separate bus or reserved seat allocation under Economy Tour, and in general prefer that the transit service not be complicated by Economy Tour. Having interpretive materials available for separate cost is not a problem, however.
- We oppose the language in Alternative C regarding the award of Commercial use Authorizations for Kantishna Day Tours.

5. The Draft VMP appears to abolish a very important constraint on the growth of Kantishna traffic without analyzing the impacts or explicitly replacing it with anything else.

Increasing demand for transportation to the inholdings in Kantishna remains an important factor that could upset road management at Denali. The 1997 *Entrance Area and Road Corridor DCP* provided for a specific allocation of 1,360 vehicles for Kantishna per season. This clearly delineated cap on vehicle use provides a clear tool for communicating to present and future Kantishna landowners the limits of potential commercial access to their properties. While the 1,360 number has never been approached, it does provide some certainty in allocating traffic for other uses.

The *Vehicle Management Plan* apparently does away with this important limit without even acknowledging that it is doing so, and offers no explicit replacement. Because future development on Kantishna inholdings could result in additional traffic demands that could displace other traffic on the park road, we feel that steps must be taken within this plan to as clearly limit Kantishna traffic as the 1997 DCP. Our first choice is simply to retain the 1,360 vehicle limit from the 1997 DCP, even if the other allocations in that plan go away. Other provisions in the VMP would also help, such as limiting day use trips through CUA's as in Alternative B and the creating the new Wildlife Viewing Subzone 3 in Alternative C.

6. The Draft Vehicle Management Plan identifies an inappropriate standard for affordability, and as a result fails in one of its goals.

In setting its goals for the Vehicle Management Plan, the National Park Service appropriately lists as Goal 5 to "Provide a transportation system that meets visitor access needs" with an accompanying objective to "Develop a system that is affordable and offers opportunities for the full range of park visitors." However, the plan describes a system that accomplishes neither the goal nor the objective. Affordability is addressed in only two ways within the alternatives. First, the

plan sets a standard for transit system affordability in Actions Common to All Action Alternatives (p.45) that is based on visitors' "perceived value" of the bus service. Second, alternatives within the plan describe an economy tour that is priced in between the premium tour (such as the existing Tundra Wildlife Tour) and the transit buses (such as the existing VTS system). Neither of these actions addresses the protection and improvement of the affordability of basic park access.

The Denali park road management system is unusual because access to the most basic park experience – wildlife and scenic viewing along the Denali park road – requires utilizing one of the bus systems. With the exception of a few hardy cyclists (and even the most ambitious of those usually utilize buses for part of their trip), visitors are compelled to utilize the park bus system to see the park. For this reason, it is imperative that the cost of the experience be kept as low as possible, both to encourage visitors to experience the park and to ensure equity in access. The subsidized pricing structure of other public transit models is thus appropriate for the park road "transit" service.

The standard in the Draft Vehicle Management Plan reveals a different goal for NPS at Denali. By articulating the standard for affordability to be the "perceived value" for those utilizing the system, several errors are committed. First, NPS demonstrates that it is pricing the transit system by thinking of it as any other commercial service. "Perceived value" is a pricing mechanism for commercial products or services that contrasts with producer cost-based pricing. Its objective is to increase revenues by pricing to the customer's valuation of the product or service, potentially increasing profits over a price that is wedded to the cost of production plus some increment of profit. But this misses the point with transit which should be thought of as a public service, where the goal is to entice people to use the buses by offering them a good deal, and to ensure equity of transportation access for people of all income levels. When NPS staff compares the cost of a Denali trip to commercial coach service along the Parks Highway, they are equally making the wrong comparison of a profit-making commercial service to something that should be a low-cost public service, even if the service is delivered through a private company.

Other problems with the "perceived value" standard are easy to hypothesize. What about the person who values a trip to Eielson Visitor Center at $40, but only has $25 to allocate to the trip? NPS may end up denying access to that person. What if the people being surveyed have income levels higher than the general public, and are willing to place a higher perceived value on the service than the general public might if given the chance? What about the person who decides not to take a bus because their perceived value of the ride – sight unseen – is less than the price of a ticket, even though their opinion would change if they actually took the trip?

NPS staff argue that the equity effects are difficult to measure because it is difficult to identify displaced visitors or to survey them regarding perceived value. It is also difficult to find relevant literature on the subject because the Denali system is so unique, but perhaps it is fairest to think of the bus fares as effectively being user fees since visitors are compelled to pay them to enter the park. The literature regarding equity and user fees is inconclusive, with many studies finding no change in visitation after user fees are imposed while others finding that some low income people are influenced by price.[1] However, it is notable that most user fees tested in research are well below the combined entrance fee/bus ticket cost at Denali, and may not be reflective of the case

[1] E.g. Burns, R. & Graefe, A. (2006). Toward Understanding Recreation Fees: Impacts on People with Extremely Low Income Levels. Journal of Park and Recreation Administration 24(2), 1-20.

here. However, the National Park Service could avoid the dilemma by choosing a different standard for the price of the transit service and avoid the equity issues altogether (see below).

Perhaps the most useful study is one that argues that user fees influence visitor's decision to visit public lands as a portion of the overall cost of a trip.[2] NPS staff at Denali have also argued in conversations that the cost of a Denali bus trip is such a small part of the overall cost of a trip to Alaska that the transit fare is inconsequential. However, this is not the case for Alaskans or seasonal employees who live along the road system, who should be among the park's most regular visitors. But for these groups, the combined price of VTS tickets and entrance fees would be a substantial portion of the cost of trip.

We note that many national parks now offer a "free" transit service to park visitors. In a few cases, there are portions of the parks where access is restricted to transit (Zion, Grand Canyon). Often the cost of transit is covered by charging a transportation fee add-on to the park entrance fee. We understand Denali is different because of the length of trips in the park and the challenges of driving the park road. Denali also has many fewer fee-paying visitors than many of these parks. However, all of these parks find value in offering a very low-cost service. We don't see that being an important goal in the Vehicle Management Plan, but it should be.

In the DCC alternative below, we suggest a better standard and more active approach to achieving the goal of affordability for basic access to Denali.

7. The DCC Alternative - we combined the useful concepts of this Draft Plan into a better management alternative that retains the essence of the 1997 plan.

Although we remain doubtful that a severe problem in transportation management exists at Denali, we are willing to consider the concept of changing bus allocations, schedules and tour types, as long as such a change will not impair resources. The two action alternatives in the Draft Plan do not explore the full range of possible management strategies for achieving this end, and are focused more narrowly on how access can be increased.

We are convinced that NPS' proposal to abandon the regulatory limit and employ Adaptive Management as a central strategy for arriving at a series of indefinite capacity numbers over the years is not the best or only way to manage traffic at Denali National Park and Preserve. We are also convinced that neither of the Action Alternatives (maximizing access/maximizing flexibility) should be a central theme or purpose of the new system.

Therefore DCC has developed a unique alternative that provides a more protective choice to the ones available in the Draft Plan. Our alternative:

- accepts that some scheduling changes can better protect the visitor experience along the park road, but should be made and vetted within a regulatory limit.
- advocates for keeping the bus types and destinations simple and identifiable, within a system that does not look a lot different from what we have today.

[2] Ostergren, D., Solop, F. I. & Hagen, K. K. (2005). National Park Service fees: Value for the money or a barrier to visitation. Journal of Park and Recreation Administration 23(1), 18-36.

- better protects transit, which is an obligation of NPS to provide to visitors.
- better protects transit system affordability, making this system more accessible to Alaskans and other independent visitors.
- provides an overall strategy to protect the Kantishna/Wonder Lake region, utilizing a mix of ideas from the Draft Plan.

Here are details of the DCC Alternative.

a. The DCC Alternative for carrying capacity, explained below, avoids some of the potential weakness of adaptive management by utilizing it for a research purpose within the context of a regulatory limit, over a limited time horizon.

NPS considered but dismissed an alternative that would have utilized adaptive management within the current regulatory limit. A minor variation of that alternative would save time and money and develop a defensible limit for vehicles on the park road.

Components include:

- In the near term, retain the regulatory cap of 10,512 vehicles west of Savage.
- Utilize the information gained from adaptive management and the traffic model to adjust scheduling and bus allocations.
- Over a limited timeframe (3-5 years) define a new limit, if indicated and protective of resources, that fixes possible flaws in the 10,512 seasonal cap, using information gathered from the Road Capacity Study and monitoring.
- Put the new limit, however it is expressed (seasonal and daily limits, even hourly limits), into regulation and into the General Management Plan within five years from the Record of Decision, while providing comparative information so that the public can understand at a glance how the limit has changed, if it has changed, and how it will be reflected in the bus system's operations.
- Utilize the traffic model and any additional adaptive management activity to optimize traffic patterns in succeeding years, under the new cap.

The DCC Alternative would accomplish the NPS goal of creating a defensible capacity number while retaining the enforceability of a regulatory limit. It would not require annually revisiting the limit over an indefinite time period, thereby avoiding some of the problems and expense associated with the adaptive management method and the time lag to publishing in the Compendium. The DCC Alternative would limit the expense of monitoring and modeling activities to a few years only, with less frequent follow-up monitoring. We are confident that a defensible carrying capacity number can be developed with reasonable accuracy within a fixed time period. We sense that NPS already has enough data from the Road Capacity Study to come up with a rough approximation of that number right now. We recognize that the limit may be expressed differently – perhaps a daily or hourly limit with different limits for the 2 (or 3) management zones along the road, but it should be possible to calculate a seasonal number for the sake of comparison.

b. The DCC alternative would continue strict limits on traffic to Kantishna in order to avoid future uncontrolled increases in this traffic, which could destabilize NPS road management.

Here is what we would like to see:

- Our first choice is for NPS to simply retain the limit of 1,360 vehicles per season from the 1997 DCP. It still has validity even if NPS changes the 10,512 overall vehicle limit, and requires no action other than an acknowledgement that it still exists.
- We support elements from Alternatives B and C that will also help limit Kantishna traffic, although we cannot tell from the NPS analysis whether these actions would be sufficient on their own to limit growth in Kantishna traffic, so we cannot support them as a substitute for retaining the existing 1,360 vehicle limit. These are:
    - The commercial use authorization for Kantishna day tours described in Alternative B that limits the authorization to no more than four day tours per day for all lodges combined.
    - The creation of Wildlife Viewing Subzone 3 described in Alternative C, which seeks to preserve the lower traffic volumes presently found on the section of road between Eielson Visitor Center and Wonder Lake. We do, however, believe the zone should extend along the Wonder Lake Campground road and along the main road to the Old Park boundary rather than stopping at the road junction.

c. The DCC Alternative better protects Transit service priority than the Draft Plan.

DCC supports the statement in Actions Common to All Action Alternatives (p.45) that the "transit service would have priority" in allocating vehicle use within the transportation system. However, the plan needs to strengthen the tools to define and protect this priority. It needs to strengthen the one indicator that protects this service and add an additional indicator to further protect Transit.

- The principal (perhaps only?) tool to defend the transit system priority is the Hiker Wait Time indicator. We support the standard, but question the rationale for the particular values selected. What is the justification for allowing 25% of hikers to wait more than 30 minutes and up to an hour (or more)? We would prefer to see a tightened standard which leaves fewer people waiting so long. Our main concern is for the first row of the standard, which we would like to read:

At least 90% of hikers will have wait times of less than 30 minutes for pick-up by a bus, averaged over 5 years. No one year will have less than 85% of hikers with wait times of less than 30 minutes.

  We could entertain the possibility of having the existing standard described in the plan apply to the less-traveled Wildlife Viewing Subzone 3.

- In addition to a "Hiker Wait Time" standard there should be a "Departure Wait Time" standard. How long does someone have to wait to for a bus from the Wilderness

Access Center into the park if they wish to go hiking, picnicking, etc.? In the end, overall vehicle capacity will trump departure wait time, but if transit is to truly have priority in allocations, then Departure Wait Time is a crucial feature. Without this standard, how does NPS know when it needs to move buses from tour to transit? It can always leave enough empty seats on whatever transit buses are available to make sure hikers aren't waiting that long along the road. "Hiker Wait Time" doesn't speak to whether transit riders are being turned away at the Wilderness Access Center because there aren't bus seats available. This is not particularly an issue now, but it was within the past 20 years and it could be again within the next 20.

d. DCC's alternative would keep Transit and Tour identifiably separate and consider more equitable ways to operate and market Transit at Denali.

After much thought, DCC has come to the conclusion that the original distinction between the tour buses and buses that visitors use instead of their cars for independent sightseeing and transport still makes sense. While the proposed "economy tour" was worth investigating, in the end it may just confuse visitors more. We believe that putting economy tour and transit on separate buses – as in Alternative C – would be too inefficient. To maintain service levels, it would be necessary to run almost the entire slate of VTS buses twice in order to both maintain the Hiker Wait Time standard for transit buses and to carry all the passengers who just want the tour. To try to distinguish the two services on a single bus system – as in Alternative B – just seems confusing to explain. How does someone on the phone or at the desk in the WAC explain that visitors need to pick which service they are taking, even though it is the same bus? What about the visitors who might want to get off and hike for a while, but won't be sure until they are out in the park and can evaluate the landscape and weather conditions? If fares are differentiated as is suggested in the alternative, then don't some feel as though they are being shorted, or try to game the system by claiming they are transit riders when in fact they wanted the tour? Using an economy tour fare to guarantee a seat is problematic at best, and should not be needed if the Hiker Wait Time standard is not exceeded.

We suggest four improvements to the existing arrangement.

- Change the labeling for the VTS, which has always been a lousy name/acronym for marketing purposes. Finding a good label is challenging, but it needs to be done. "Denali Sightseeing and Hiking"?
- Offer self-guided materials as an add-on to the transit service rather than as automatic inclusion of an "economy tour" as suggested in Alternative B. This allows all visitors to travel the park road for the minimum price if they so choose. No seat guarantees would be made.
- To distinguish the transit part of the service, price tickets by the distance the visitor is traveling rather than by the bus turnaround destination. In other words, if a group just wants to go as far as Mount Wright to hike, they don't have to buy a bus ticket to Eielson or Toklat. The road could be divided into zones and tickets color-coded to make it easy to identify for which zone travel is allowed. Visitors unsure about their destination would be encouraged to buy a ticket all the way to the turnaround. Such a policy would also assist with affordability, particularly for repeat visitors who know what they want to do.

- Turn the reservation system for tour and transit over to a 3rd party which is either compensated by a flat fee or on a per transaction basis, without reference to the value of the tickets sold. This would help to ensure equitable marketing of the tour and transit opportunities.

e. DCC's alternative would establish an appropriate standard for the affordability of basic access, and include a commitment to an ongoing process of pursuing least-cost transportation options for visitors. This approach requires NPS to look at the Transit service differently than it does at present. We would like to see:

- NPS treat transit as a public service, not a commercial service. The agency presently provides this service through the park concessioner, but that arrangement should not define its understanding of the service, and the agency should always be open to other ways of providing this service in the future. We reject comparisons of the Denali transit service to commercial bus services; the proper comparisons are with other public transit systems.
- A standard for affordability that is grounded in providing the service at the least possible cost to visitors. For the near term, this standard may not result in different pricing for transit than at present, but it avoids the danger of allowing higher and higher prices being charged under the standard of "perceived value."
- A goal in the plan of developing least cost solutions to the provision of basic access at Denali. Continuous improvement in transit pricing through identification of subsidies, reduction of operational costs, and exploration of alternative modes for service delivery is essential.
- NPS asserts that presently the revenue from the various bus tours subsidize the cost of the VTS transit system. This seems a critical fact for understanding the affordability issues of the VTS, but there is no analysis in the plan. We would like the EIS to include the annual operating cost of the VTS, the annual revenues from VTS, and the amount of subsidy derived from tour revenue. We realize that some of costs are interlocked, such as the cost of the bus wash and maintenance facility and administrative expenses, but it should be feasible to tease out the portion of each that can be attributed to VTS.
- Taken together, the points above also point toward an investigation of ways in which transit and tour could be decoupled. Combining those services with different purposes under one concessions contract seems to create some perverse incentives and expectations. The decision to combine the services in the early 1990's was not well-supported at the time, and we wonder why NPS has never investigated the potential benefits of splitting them apart again, though we recognize there is some simplicity involved in having a single operator (mostly) along the park road.

f. <u>Other elements.</u> The DCC Alternative selects additional concepts from the Draft Plan that will most effectively protect park resources and road character. We list them as follows:

i. **Keep Tour destinations and stops very similar to the way they are now** –
   a. We suggest that Premium Tour to Eielson replaces no more than 2 transit buses per day and that tour plus transit together not increase traffic to Eielson pending further analysis of the fragile landscape next to the park road between

Stony and Eielson. There should be no increased tour to Kantishna beyond what is already done by the Kantishna Experience.

b. The short tour to Teklanika may be acceptable but has impacts that have not been analyzed in this plan. In any case, the reasons to extend the short tour to Teklanika have not been adequately explored. There could continue to be some short tours that turn around at Primrose.
c. If Premium Tours are expected to use the Stony Hill viewpoint, the plan should specify a "number of buses" standard for this pullout.
d. NPS has not adequately addressed, under "existing conditions," the evaluation of the resource condition at the Polychrome overlook after toilets were removed from this location. Several park users have informed us that there have been impacts from this removal, not all of them positive. Has NPS decided to leave comfort stations off Polychrome? In any case a "number of buses" standard is needed for this overlook.

ii. **Priority of MSLC interpretive programs above commercial tour –** We support this concept in principle, but only after the plan presents greater detail on how it will be implemented. Will there be dedicated MSLC vans or will the MSLC use transit buses, what is the expected daily impact of MSLC programs on the park transportation system, etc.? Will MSLC vehicles be monitored using Tier 1?

iii. **Teklanika access** – We support ongoing RV access to Teklanika, but we believe that it is fair to request those with private vehicles to access the campground during times of lower bus volume, when necessary to maintain standards.

iv. **Professional photography and film crews bundling of permits –** We support the bundling of the two types of permits.

v. **Bus design –** We, generally, support the design vehicle as described in the Park Road Design Standards. We oppose MDX buses west of Eielson. We hope NPS will attempt to avoid the situation that has developed over the years of designing the road to fit the bus instead of using buses that fit the road.

We suggest development of a custom bus that fits within Design Vehicle and Road Design standards

We note that the off-the-shelf buses used at Denali are not ideal for other reasons. Many buses have windows that fog or are easily muddied on rainy days. Windows are difficult to open, and are divided across the line of sight. Some buses produce an excessive amount of dust, or are less adept for driving on some portions of the road. We believe all of these issues could be addressed by designing a custom bus for Denali, and encourage NPS to pursue the design of such a bus.

We support the efforts in Alternative C to enhance comfort on tour buses by reducing the number of seats.

vi. **Camper bus –** DCC's alternative supports continuation of dedicated Camper Buses with inside storage. However, we are sympathetic to the goal of having all buses in the transit system be able to pick up backpackers and campers, and for backpackers and campers to be able to depart the WAC on any transit bus. A custom bus design could also enable this arrangement, and allow for the elimination of camper buses in the future.

8. **Given the need for additional public understanding and a greater range of choice,** we suggest that the agency complete a revised Draft VMP with the following new information.
    a. **A new alternative/s** using adaptive management in the context of an overall, regulatory limit, and no increase in road traffic. Only then will the full range of alternatives be available for public comment.
    b. Revised **cost analysis**, including what franchise fee programs may be at risk in order to operate this plan, and how this plan could affect base funding for NPS staffing positions and other bus-related services.
    c. More information to show that the existing transportation capacity number (10,512) is not already degrading park resources.
    d. Impacts analysis of relevant infrastructural changes triggered by this plan, especially at Teklanika.

Summary

DCC feels the most significant issue in the plan is the determination of carrying capacity on the park road. We acknowledge that there are some problems with the manner in which the existing seasonal road capacity limit has been defined and implemented. However, we do not feel that NPS has made a compelling case for altering carrying capacity at this time, and its proposed alternative capacity lacks sufficient clarity and cost effectiveness to be a useful substitute. The Action alternatives ignore potentially destabilizing details such as traffic to Kantishna, do not sufficiently protect the transit priority, and have some significant problems with indicator selection and implementation. Both plan alternatives also establish an inappropriate standard and lack a focused effort for ensuring the affordability of basic access at Denali. The document is deficient as an EIS because it fails to consider a full range of reasonable alternatives, despite these obviously having been pointed out to NPS during scoping. Some other action items (or variations) in the plan are potentially worthwhile but could be accomplished with an EA or other lower-level document.

We do believe that adaptive management potentially has great value for managing the park road, and applaud the research that has been a part of the park road study. However, we also believe in the value of a defined carrying capacity for the park road that can be easily understood and communicated, that the appropriate role for adaptive management is to help **support** that number, to optimize traffic within the defined capacity, and to alert managers to serious problems.

Again, thank you for the opportunity to comment and for making your staff so available to us for questions. This has been one of the most active comment periods in recent memory, and well it should be. The numerous stakeholders, drivers, employees, tourism, inholders, individual users, stand to be profoundly affected by the actions in this plan. That is why we suggest a Revised Draft – to clarify how the plan will actually work and to provide a greater range of alternatives from which to choose.

Sincerely,

Nancy Bale

Nancy Bale, Director
for the Denali Citizens Council Board and members



Denali Park Road
Vehicle Management Plan
ALASKA VISITOR INDUSTRY COMMENTS
October 31, 2011

October 25, 2011

Denali National Park and Preserve Planning
PO Box 588
Talkeetna, AK 99676

Dear Park Planners,

Thank you for providing the Alaska Travel Industry Association (ATIA) the opportunity to comment on the Denali Park Road Vehicle Management Plan. This plan has monumental implications for the travel industry over the next twenty years and as a result, we have engaged the full range of visitor businesses, large and small, in a comprehensive series of meetings and discussions over several months to compose these comments. All ATIA members had the opportunity to contribute to the draft.

ATIA represents over 1,100 member businesses servicing the tourism industry in Alaska. Denali National Park and Preserve is one of the premium destinations for Alaska visitors and many of our member companies have products that in some way include this park. Since the experience of the vast majority of park visitors is in some way connected to the park road, your undertaking is of immense importance to our members. Our members serve a wide variety of park visitors from backpackers to budget travelers to premium tour passengers to patrons of the lodges in Kantishna. It is our sincere attempt with the comments within to acknowledge the right for the full spectrum of visitors to have experiences of the highest possible quality in Denali National Park and Preserve. Continuing involvement in the planning process for the Denali Park Road Vehicle Management Plan is a priority of our Tourism Planning Committee.

ATIA desires that tourism resources be developed in a prudent manner to assure long term sustainability of the wide diversity of tourism businesses, small and large. In so doing, we recognize the importance of remaining attentive to caring for the environment, the recognition of cultures and to Alaska's unique quality of life.

Introduction

IMPORTANCE OF DENALI NATIONAL PARK TO ALASKA'S TRAVEL INDUSTRY

Since 1980, a vast area of land in Alaska was added to our national parks, preserves, and monuments. Now some fifteen park units encompass 54 million acres of Alaska. What has not changed in all these years since is this: Denali National Park and Preserve remains the only national park whose borders are accessible to Alaska's paved highway system ***and*** has a road providing access to its remote areas. Some parks have primitive roads touching their borders (Wrangell St. Elias, Gates of the Arctic, Kenai Fjords, Yukon-Charley) and some parks have limited primitive roads within them (Katmai, Wrangell St. Elias) and some can provide large and small boat access for large numbers of visitors (Glacier, Kenai Fjords), but no national park, other than Denali, has both highway access and a road penetrating into its interior. Add to this Denali's unique geographical position between Alaska's two largest communities and two largest airports (Anchorage and Fairbanks) and it is no mystery why Denali is still a critical component to the entire state's Tourism Industry, from Ketchikan to Barrow.

The tourism economy is critical to Alaska. Tourism is one of Alaska's largest industries and one of Alaska's largest generators of employment, with over $1.6 billion annual contribution to Alaska's economy. This does not include goods and services coming from outside the state. The economic importance of Denali National Park and Preserve to Alaska is tremendous. In an ideal world, increased access to Alaska's other national parks could take some pressure from Denali. The fact is, we don't see much evidence of this changing over the next twenty years. While we acknowledge that the unique resources that make Denali so special (the wildlife, the pristine landscapes, the unique ecosystems, the high mountain scenery) must be appropriately safeguarded, we

believe that the next twenty years should provide optimum access for the wide spectrum of visitors to Denali while attending to those safeguards. We believe the Denali Park Road Vehicle Management Plan provides such an opportunity.

PUBLIC ACCESS TO NATIONAL PARKS TAKES MANY FORMS

There appears to be an expressed bias by the National Park Service to maximize low cost, transit bus access for riders and that this is the preferred access mode of the general public. While we certainly acknowledge that a substantial amount of access must be guaranteed for the lowest cost transit riders and that a methodology must be present to make this type of access reasonably priced, we wish to point out that the general public actually chooses from a wide range of options for their visit to Denali National Park. These options include, and are not limited to, riding the Transit buses in an unguided fashion (both staying on the bus and getting off to hike); choosing guided, Premium Bus Tours because of the value added to the experience and/or as a part of a multi day package in Alaska; choosing a more interactive and small-group park experience by booking a trip with one of the Kantishna Lodges; and driving a car or RV to the park area to enjoy a camping experience. Please note that all of the above are park visitors and constituents of the “general public”.

Alaska’s parks are far north and remote: distance between parks and other protected areas can be expansive, wilderness conditions are ever present, wildlife dangers are always a potential, and the northern climate can be extreme, even in summer. Many Alaska visitors choose to visit National Parks in a tour or guided format in acknowledgement of the value added component in facing these barriers and challenges. Indeed, most of the first visitors to Denali National Park, as early as 1923 enjoyed a full-service, guided, and outfitted experience with horse transportation (later motorized) to Savage Camp on the Savage River. It is unreasonable and inequitable to assign a priority to one form of use of the general public without defining relative priorities of other forms of general public use.

LOW COST TRANSIT OPPORTUNITIES AND PREMIUM TOUR VOLUME ARE INTRINSICALLY LINKED, BOTH ARE ESSENTIAL, AND THEIR INTERRELATIONSHIP SHOULD BE ACKNOWLEDGED AND FORMALIZED.

The Visitor Industry acknowledges the priority to provide access to Denali National Park and Preserve through a simple Transit bus system that is as affordable as possible to those who want to or can only afford to get access in this manner. Cost should not be a barrier to providing unique natural experiences in our national parks. However, it is broadly recognized that, in the current and any likely future contractual arrangement, reasonably priced transit service is not possible without a certain volume of Premium Tours. The price and volume of Premium Tours subsidizes the lower cost and less efficient occupancy (to facilitate hikers and campers) of the Transit tours. We believe this essential link between the two types of services should be formally recognized and empirically established. A desired volume of Premium Tours creates the condition where reasonable pricing of Transit service can exist. The latter cannot exist without the former. Our Visitor Industry Alternative proposes such a prescribed relationship.

Furthermore, since this plan considers management of the park road for up to twenty years into the future, it is paramount that the capacity of the various tours and Transit bus system remain somewhat flexible in order to adequately respond to consumer demand from year to year and over time. Arbitrary limits on any tours or forms of transportation that result in unused capacity of other forms are counterproductive for maximizing visitation to the park. This flexibility must be built into the plan.

Visitor Industry Alternative

EXECUTIVE SUMMARY OF VISITOR INDUSTRY ALTERNATIVE

The Adaptive Management approach should be pursued, but the safety net of a Fall-back Plan should be included in case funding of the necessary research or other conditions make Adaptive Management unsuccessful.

The Visitor Industry prefers Alternative B, with some important modifications.

Transit service and the Self Guided Economy Tour riders would be combined into the same service (as they are in the existing condition) but not differentiated into separate products.

Guided Premium Tours would consist of a short tour to Teklanika (4½ hours), Premium Long Tours to Toklat/Stony Dome (same as today's Tundra Wilderness Tours), limited Premium Long Tours to Eielson Visitor Center, and limited Premium Long Tours to Kantishna.

The allocation of buses to the Transit and Premium Long Tours would be linked in a set ratio that would only be altered temporarily from season to season to adjust to market demands.

With regard to Other Vehicle Use, the Travel Industry Alternative is in general agreement with the concepts presented in Alternative B.

Other Long Range Planning concepts are presented, consistent with our previous submission.

VISITOR INDUSTRY ALTERNATIVE

1. The Adaptive Management Approach and the Fall-back Plan.

The Alaska Visitor Industry prefers Alternative B, with the important modifications specified below and with a built-in Fall-back Plan, if the Adaptive Management approach fails for any reason. We believe that the Adaptive Management approach provides more opportunity and flexibility compared with managing against a hard number of vehicles, as is currently provided under the 1986 GMP, and we support this approach. However, such an approach must be taken thoughtfully and with an appreciation of the park Vision Statement. Assessing wildlife fluctuations and behavior appears to be an imprecise science and fluctuations of behavior may be impacted by factors other than vehicle frequency, such as weather, climate, seasonal availability of food sources, animal to animal interactions, etc. These need be taken into consideration prior to any major changes to the transportation system. Indicators need to be weighted appropriately and the efficiency of vehicle utilization needs to be factored in as well.

Social science indicators of crowdedness also need to be assessed thoughtfully, as virtually all respondents would likely acknowledge preference for a more solitary park road experience. Sufficient checks and balances need to be incorporated into the decision process, so that changes responding to indicators would result in tweaks and improvements and not radical modifications. In addition, increased quality of interpretation, especially with the Transit service, would serve to enhance the understanding of visitors of the benefits and rationale of the bus transit concept in its relatively harmonious impact upon wildlife, as opposed to passenger car alternatives. This alone would result in more favorable results on visitor surveys and an enhanced appreciation for Denali's unique access system.

The Visitor Industry must plan ahead at least two years prior to operating in any given year and a certain level of volume and predictability is required. The current system has generally allowed for this and the new system must, as well. We strongly recommend that the new plan includes a provision where any reduction in volume of Premium Tours requires a two year advance notice, whereby the Visitor Industry can

adequately plan for success. It would be extremely difficult and cause severe disadvantages to the entire Alaska Travel Industry if dramatic changes are made with less than a two year warning.

While the Adaptive Management is a progressive and positive approach to maximizing a full range of visitor experiences, without degrading the natural environment, it is not without issues. Here are the questions that this approach poses for the Visitor Industry:

a) Will Adaptive Management work in the long run? It appears experimental, complicated and is to be played out over many years.

b) Can the substantial funds to perform the necessary monitoring be assured?

c) Will unending experimentation and yearly tweaks eventually result in a system less efficient (less volume, less predictable) than the status quo?

For the aforementioned reasons, we believe a Fall-back Plan should be built into the New Vehicle Management Plan in case Adaptive Management proves unsuccessful or if the critical funding for the essential monitoring is cut to such a level to make the management plan unworkable. The Fall-back Plan would consist of the following:

a) The lessons learned from Adaptive Management, the data collected, and appropriate monitoring can be used to improve the system.

b) The vehicle limit should be the average of ALL vehicle usage during the peak three years of the last ten, inclusive of the DNHT and road construction traffic, plus a modest 10%.

c) The Fall-Back Plan would NOT have set limits on any particular type of service and this would allow flexibility to move allocations between service types.

The Fall-back Plan could be triggered by funding cuts or other conditions that make Adaptive Management unsuccessful. Alternatively or in addition, the Fall-back

Plan could be triggered by a five year review to assess the performance of Adaptive Management. Regardless of whether or not Adaptive Management continues to be implemented, we recommend a five year review of the plan to provide stakeholder involvement.

2. Transit and Self Guided Economy Tour.

In our vision, Transit service and Self Guided Economy Tour riders would be combined into the same service (as they are in the existing condition) but not differentiated into separate products. The Transit system would be adequately explained to provide both access for off bus experiences (camping and/or hiking) and for the most economical way to experience the park road, without departing the bus or any combination thereof. Optional interpretive materials could be made available to ANYONE who wanted them, be they campers, hikers, or stay-on-the-bus travelers. The same pricing scheme would be consistent whether you got off or stay on the bus and anyone could purchase interpretive tools to enhance their visit. Minimum but somewhat standardized interpretive messages would be provided by drivers without the intention of providing a fully narrated tour. Interpretive messages would include basic safety, park purposes and the rationale and benefits of the Vehicle Transportation System. The level of interpretation would be basic and minimal. In order for visitors to accurately distinguish between the Transit service and the Premium Tours, for the purposes of marketing this trip, it would not be described as a narrated tour.

We encourage pre-booking of the Transit buses while still setting aside sufficient capacity for independent travelers, who make their arrangements much closer to the day of departure. Perhaps up to 50% of usable capacity could be booked in advance. We encourage the design of a system, where visitors can also pre book the return trip from an intended point along the Park Road to assist with bus management on a daily basis.

3. Guided Premium Tours.

Guided Premium Tours would consist of the following:

A) ***Premium Short Tour to Teklanika***. The Premium short tour to Teklanika would be approximately 4 ½ hours in duration. These tours would be offered to designated locations throughout Wildlife Viewing Subzone 1 (Savage River to Teklanika). Topics and activities for the short tour would be standardized (i.e. wildlife, park history, wilderness) to increase operating efficiencies in training and marketing. Off the bus interpretive/interactive experiences would be conducted along the way. While each tour should have an experience of equal quality, it may be possible to include different "off-the-bus" interpretive experiences for different buses so bottlenecks are not created. For example, one bus may experience the living history cabin experience (similar to what is now in place for the Denali Natural History Tour) and another may experience a loop hike with interpretive staff and/or signage and exhibits. All tours could end with the option to visit the entrance Visitor Center.

There are several important goals of this trip: 1) to provide a short, quality alternative to the Premium Long Tours; 2) to provide a more in-depth park experience than is currently provided by the DHT; 3) to provide enough volume to reduce pressure from the more sensitive park habitat beyond for the next twenty years; 4) to help assure visitors take a trip that is best suited for them to increase the satisfaction levels of both the longer and short tours; 5) to maximize the use of the section of the road that is engineered best for volume while traversing less sensitive ecosystems than the road beyond.

For the reasons stated above, the Adaptive Management plan for this section of the Park may be more liberally applied.

B) ***Premium Long Tour***. These tours would be offered predominately from the park entrance to Toklat/Stony Dome (7-8 hours), as they are today. The tours would start with a pickup at the local hotels or with a pickup at the Wilderness Access Center.

A limited amount of Premium Long Tours would extend to Eielson Visitor Center (9-10 hours). The daily quantity would be determined by the combination of market demand and facility constraints (capacity of the Visitor Center and parking at Eielson Visitor Center.

Premium Long Tours to Kantishna could be offered on a limited basis to meet demand, as they are today. However, if demand decreases in the years ahead and/or a growing demand exists for other Premium Tours, this tour should be eliminated, thereby allowing the day trips of the Kantishna Lodges to meet the remaining demand for this trip.

We believe, unless market demand dictates otherwise, the total of Premium Long Tours should equal or exceed Transit buses due to the fact the volume of the Premium Tours help keep the Transit service reasonably priced. The allocation of buses to Transit and Premium Long Tours would be linked in a set ratio that would be altered temporarily from season to season to adjust to market demands.

4. Creation of Transportation System Advisory Council

We recommend the formation of a Transportation System Advisory Council or Committee made up of a wide range of stakeholders, including but not limited to a range of tourism representatives representing multiple segments of travel. This group could meet annually to review the system, review relative allocations of the buses over the various tours and transit service and recommend improvements. This same group could be involved with the five year review process of the Adaptive Management approach and also be involved, if there is ever transition to the Fall-back Plan as described herein.

5. Other Vehicle Use

The Travel Industry Alternative is in general agreement with the concepts presented in Alternative B, with the exception noted below.

For the Kantishna Lodges, the current system works well. Each establishment has unique transportation needs, company culture, and operation. Transportation is part and parcel to the overall experience at the inholding and should not be consolidated. Flexibility should be provided to accommodate daily variances in volume and modest growth opportunity as appropriate and warranted.

6. Additional Comments

TOUR ALLOCATION SYSTEM AND NPS ROLE

It is very important for NPS to recognize the seat allocation, inventory control, comparable pricing and competitive marketing of tour products can be major contributors to the number of vehicles on the park road. Expanded tour choices, improved logistics, higher quality experiences and enhanced vehicles will not necessarily resolve current problems without enhancements in the tour inventory, pricing structure and allocation system. For this reason, we believe NPS must take a more active role in managing the transportation contract, after it has been let.

All tour companies should have a fair playing field in receiving tour allocation. If an allocation system is necessary, it should be addressed in a manner that is flexible and transparent. Industry involvement in designing such a system should be sought prior to putting the specifications of such a system out to bid. ***In addition, once the transportation service has been contracted, an annual review by NPS and stakeholders to consider improvements should be conducted.***

The current inventory, tour pricing and reservation processes often do not accommodate the choice of the individual visitor, within a tour program, in an efficient manner. Tour operators and packaging companies are unable to receive block for all park tour and VTS options. This creates an inflated demand on the longer tour seats,

thereby potentially increasing the number of vehicles on the Park road unnecessarily. In the event of the availability of two or more high quality and premium priced tour options of varying lengths, such as proposed in this document, an improved inventory, rate structure, and reservation system to accommodate limited individual choices of the visitor should increase the quality of the visitor experience and decrease the number of visitors taking a trip not best suited for them. Allowing a limited number of passengers to change their choice with short notice could also be considered, if the inventory system will also help in managing these options effectively.

The future concession agreement should include a rate structure that allows for qualified park “Tour Re-Sellers”, who provide the widest marketing value and distribution such as package tour operators and wholesalers, as well as to “Point-of Sale Resellers” such as qualified area hotels and travel agents. The travel industry typically has an established commission structure that will reward Re-Sellers for marketing and booking any premium tour that is the most suitable for the clients’ interest, allowable time, and budget. The industry standard is 20% discount for qualified wholesalers and 10% for qualified travel agents off of the “Rack Rate” pricing that is established by the National Park Service and/or the Concessionaire. The Premium Tours and the Transit service should be commissionable on this basis.

As mentioned previously, perhaps at least 50% of the capacity of the Transit buses should be allowed to be pre-booked under generally acceptable industry terms. This would eliminate the eight seat limit and would not require the inclusion of specific names at the time of the initial booking. However, we acknowledge the importance of setting aside sufficient capacity for booking near or on the day of departure to meet the needs of independent travelers.

Lastly, the tour mix and respective capacities should be evaluated regularly to ensure tour mix is meeting visitor demand. As the industry evolves over the next twenty years and passenger expectations shift, there must be flexibility to respond to the market.

NOTES ON ROAD SAFETY

Every effort should be made to improve any section of road where basic safety is a concern. Safety should take priority over managing for a “primitive road experience”. An extra 6-10 feet of road width around a narrow curve will not be viewed as “less wild” or “less primitive” by park visitors. The visitor industry would welcome the opportunity to propose specific areas for road improvements.

Since our alternative contemplates a high volume Premium Tour to Teklanika that may involve larger and more comfortable vehicles than those which traverse the entire length of the road, it will be important that the first thirty miles of the park road are engineered properly for the volume and vehicle size anticipated.

BEST STEP FORWARD FOR TWENTY YEARS

The Travel Industry takes seriously the opportunity to plan for the next twenty years. Once a transportation concept has been developed, we recommend the Park Service convene an unbiased team of experts, composed of consultants with extended experience in visitor services, logistics and interpretation both inside and outside of the Park Service and inclusive of professional tour providers. Every opportunity should be taken to provide for the highest quality visitor experience possible and “out of the box” thinking should be welcome. The public and the visitor industry should have an opportunity to provide input in the process. The funds necessary for thoroughly examining options to enhance the quality of the visitor experience would be well spent.

PREPARE FOR CAPITAL AND OPERATIONAL EXPENDITURES

While we realize that it is not within the parameters of this planning process, to truly enhance the visitor experience in Denali National Park, we believe it will be necessary to think beyond vehicles and vehicle logistics. Over time, capital and operational expenditures will be necessary for parking improvements, visitor centers in key locations, improved rest stops in key locations, trails, interpretive staffing, covered/enclosed gathering and dining areas and road improvements. Such improvements can be phased in over time and may include:

- Parking and turnaround areas enhanced as needed at Teklanika and Eielson.

- Covered and heated pavilions or areas provided for sitting or dining at Teklanika, Toklat and Eielson. In addition, “take in/take out” of foods with each bus may be appropriate, but the possibility of beverage and/or provision of simple snacks, beverages and meals should be considered. Visitors need space to get out, move around, have contact time with the

- Park and have a pleasant dining experience rather than be expected to get by on a “snack” eaten uncomfortably on a bus.

- A substantial Visitor Center at Teklanika, as well as an amphitheatre for interpretive presentations. This may be best placed in an area separate from the Teklanika rest stop that services Transit and Long Premium Tours.

In closing, as the planning process continues, we look forward to working closely with the National Park Service to ensure that the final plans provide a wide range of the highest quality experiences for visitors to Denali Park and Preserve while protecting the unique resources that make the Park a rare and special place.

Respectfully,

Ken Dole, Chair ATIA Board
Kirk Hoessle, Tourism Planning Subcommittee Chair
Ron Peck, ATIA President and COO

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October 31, 2011

Miriam Valentine
Park Planner
Denali National Park & Preserve
P.O. Box 588
Talkeetna, Alaska 99676

Dear Ms. Valentine:

The Citizens' Advisory Commission on Federal Areas reviewed the Denali Park Road Draft Vehicle Management Plan and Environmental Impact Statement. We offer the following comments for consideration in finalizing the plan to manage traffic on the park road.

Vehicle Use Levels

The draft plan asserts that while the existing seasonal limit of 10,512 vehicles established by the 1986 General Management Plan (GMP) is clearly measurable, a numerical limit alone may not be the best approach for managing use of the park road. The plan proposes to set measurable indicators and standards intended to protect park resources and values along the road corridor under an adaptive management approach. This adaptive management and monitoring strategy is detailed in Appendix C.

The plan should note that the current 10,512 vehicle limit is the result of a phased reduction of the 1984 use level of 12,661 vehicles. This reduction, implemented as part of the 1986 GMP, included a planned 20% increase in tour and shuttle bus numbers and a 45% decrease in the number of private vehicles.

While we agree that a numerical limit alone may not be the best approach for managing vehicle use, we are not convinced that impacts arising from the current system are of sufficient magnitude to warrant extensive changes to the existing road management strategy or in use levels. However, in order for this commission and the public to objectively assess the potential benefits of the proposed management and monitoring

strategy versus the current fixed numerical limit, more information is required. Little or no information is presented on the actual number of vehicles, by various type – bus, private vehicle, administrative vehicle, or vehicles transporting lodge visitors- that travel the park road throughout the season.

For example, Table 7 on page 93 lists the number of recreation visitors each year from 2005 through 2010. These numbers are broken down into 4 different categories – bus riders, lodge visitors, entrance area visitors and visitors in private vehicles past the Savage checkpoint. The table contains no information on the actual number of vehicles under each category traveling the park road during those years. Consequently, we cannot determine from the plan if use levels for the 2005-2010 period ever reached the limit of 10,512 vehicles limit or if they were at lower levels in some or all of the years. We believe it is safe to assume that traffic levels never exceeded the seasonal limit, but figures showing actual vehicle use should be provided.

There are other problems with the data presented in Table 7. The first is the recreational visitor numbers for 2010, which, according to footnote #2, were compiled using an adjusted methodology that produced an increase in total recreation numbers of approximately 8-10%. No further explanation is provided. Nor does the plan discuss how this relates to the number or types of vehicles on the park road.

The second problem is that the recreational visitor use numbers in Table 7 include the shoulder season even though management of vehicles during the shoulder season was not considered because they were determined to be outside the scope of this draft plan. (pg. 83) The result is an inflated figure that does not reflect use levels during the allocation season.

While we understand that once fully implemented the proposed adoptive management strategy is not designed to be tied to a fixed limit on vehicle use levels, it is important to define a "starting" point for that strategy. We know that the 10,512 limit is the maximum number allowed under the current allocation system. We also know that actual total use levels vary from year to year and also by vehicle type. What we don't know is the actual use levels for each year since the existing limit was established. This is readily available data and should be provided.

Need for this information is demonstrated by the four tiered structure of the proposed management strategy. According to the information in Appendix C *Adaptive Management and Monitoring Strategy for the Vehicle Management Plan and EIS,* "The first tier includes a set of indicators with quantitative standards associated with them designed primarily to regulate the numbers of vehicles on the park road in such a way that natural resources are protected and the visitor experience is preserved." (Appendix C, pg.1) Under Tier 1 of the strategy, the plan (Appendix C, pg. 3) states: "These indicators and their associated standards will initially limit traffic volumes on the park road, though further limitations may result from the higher-tiered parameters." Does this mean that traffic volumes will be reduced from the current 10,512 limit or from the actual traffic volume? No explanation is given for why current traffic volume would have to be

reduced to develop the quantitative standards in Tier 1. Consequently, it is not possible to determine if an initial reduction is necessary under Tier 1.

We suggest that the final plan include a revised table or tables that include the following for each allocation season since adoption of the current system: 1) total seasonal recreational visitors during the allocation season; 2) number of non-recreational users; 3) vehicle allocation by type; 4) total number of vehicles by type (including non-recreational users) actually using the road during the allocation season; 5) total number, by year, of vehicles using the road during the non-allocation season; and average number of vehicle by type for each year.

Teklanika Campground

Future plans for this campground need to be clarified. In Table 3 – *Summary of Alternative Elements*- (pg. 65) under Alternative B it states: "If needed, Teklanika River Campground would phase in a tents-only campground over a 10 year period with visitors using the transportation system for access." Similar statements are made in Chapter 4 - *Environmental Consequences*- on pg. 175: "Alternative B also proposes a potential change to.....Teklanika River Campground. Over a 10 year period, this campground could become a tents only campground.." and on pg. 184: "Within 10 years, Teklanika river could become a tents only campground.."

Elsewhere in the discussion of environmental consequences, the EIS (pg. 194) clearly states that Teklanika campground "would phase into a tents only camping area within 10 years of plan implementation." Similar statements indicating the closure of the campground to recreational vehicle users are found on pages 210, 211, 224 and 232. The final plan should clarify future plans for recreational vehicle camping at this campground.

We understand that the proposal to phase out recreational vehicle camping at Teklanika is intended to reduce the number of private vehicles traveling past the Savage checkpoint. This is not a new proposal, as it was included in the 1986 GMP. Unfortunately, the plane contains no information on the number of recreational vehicles that stay at this campground during an average year. Consequently, it is impossible to determine how much POV traffic would be reduced by eliminating this use and how many park visitors would be directly affected by disallowing recreational vehicle use.

We do not support the closure of the Teklanika Campground to recreational vehicles under any of the alternatives. Thousands of visitors travel to Alaska each year via recreational vehicles. Many of them will visit Denali National Park and should be afforded the opportunity to stay in the park in their recreational vehicles without being limited to the entrance area. The limited number of campground permits available to recreational vehicle users, as well as the current restrictions requiring a minimum 3 day stay and which do not permit travel past the Teklanika campground are adequate to protect park resources, while still providing camping opportunities for this segment of the visiting public.

Inholder Access

Under Alternatives B and C, the plan proposes to issue commercial authorizations to those lodge or business operators in Kantishna who currently provide day tours. These day tours are now conducted under the allocated road permits which provide for inholder access under ANILCA Section 1110(b). The reason given for this proposed change is that "Conducting commercial activity in the park outside the boundary of the inholding is not provided by Section 1110(b)." (pg. 46) While some form of separate commercial authorization may be considered necessary, it is essential that the NPS continue to recognize the guarantee of access to all park inholdings "for economic and other purposes" provided by ANILCA.

We are also concerned about the type of commercial authorization that could be required if either Alternative B or C is adopted. Day tours provided by the lodges in Kantishna are an important part of their business and should be allowed to continue. This can best be accomplished through issuance of a commercial use authorization rather than a competitively awarded concession contract. At the same time, the plan must contain enough flexibility to allow other property owners to develop businesses on their property or to take advantage of future economic opportunities using national park lands.

It is also important to note that of the current allocation of 1360 permits for access for Kantishna inholdings, only 1202 permits or roughly 90% of capacity are actually assigned. We understand that inholders requiring additional permits are not denied under the current allocation system. We are, however, concerned about the statement on page 184 that Kantishna inholder access may be "reallocated" to benefit the transportation (bus) system. This is particularly troubling in light of the longstanding NPS policy regarding Kantishna inholdings.

The 1986 GMP and Land Protection Plan included a planned reduction in the number of private inholdings in Kantishna to preclude future development of commercial visitor facilities and further reduce traffic demand. This strategy was reconfirmed in the 1997 *Final Entrance Area and Road Corridor Development Concept Plan* and most recently in a December 2010 letter from the Alaska Regional Office to a park inholder.

The allocation for Kantishna inholder access should not be reduced or permanently reallocated under any of the alternatives or under any adaptive management strategy. In addition, the potential for future increases in access needs for inholders must be recognized and provided for in the plan, consistent with the guarantee of access for economic and other purposes.

We also suggest that in order to avoid any confusion ANILCA Section 1110(b) be quoted in its entirety. (pg. 28)

The Commission appreciates the opportunity to comment on this plan. We also thank you and Superintendent Anderson for attending our October 27 meeting to discuss the plan, to answer questions and help members better understand the proposal. We

understand the importance of the Denali Park Road as a means for the visiting public to enjoy the wildlife and scenic resources of the park. We also recognize the need to manage use of the road in such a way that the public can continue to enjoy those resources. And finally, we encourage the development of a plan that will also protect the access rights and current and future economic opportunities of the businesses and property owners in Kantishna and elsewhere in the park.

Sincerely,

Stan Leaphart

Stan Leaphart
Executive Director

Cc: Sue Magee – State ANILCA Program

REFERENCES

Adams, L. G., B. W. Dale, and B. S. Shults

1989 Population Status and Calf Mortality of the Denali Caribou Herd, Denali National Park and Preserve, Alaska 1984-1988. National Park Service, Alaska Region, Natural Resources Progress Report AR-89/13. Anchorage, AK.

Adams, L. G. and L. D. Mech

1995 "Population Trends of Wolves and Caribou in Denali National Park, Alaska." Pp. 347-348 in E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, eds. *Our Living Resources: A Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals and Ecosystems*. U.S. Department of Interior, National Biological Service, Washington, DC.

Adams, L. G. and G. H. Roffler

2009 Dynamics of the Denali Caribou Herd, Denali National Park, Alaska: Progress Report (October 2008 – September 2009). U.S. Geological Survey - Alaska Science Center, Anchorage, AK.

Alaska Department of Commerce, Community and Economic Development (DCED)

2000 Background on Boroughs in Alaska. Available online at: www.commerce.state.ak.us/dca/lbc/pubs/Bkg_Boro_Govt.pdf.

2007 *Alaska Visitors Statistics Program – Alaska Visitor Volume and Profile, Summary 2006*. Available online at: http://www.commerce.state.ak.us/oed/toubus/research.htm.

2010 *Economic Impact of Alaska's Visitor Industry*. Available online at: http://www.commerce.state.ak.us/oed/pub/Visitor_Industry_Impacts_3_30.pdf.

2010 *Alaska Community Database Community Information Summaries (CIS)*. Available online at: www.commerce.state.ak.us/dca/commdb/CF_CIS.htm.

Alaska Department of Fish & Game (ADF&G)

1992 Final Development Concept Plan, Environmental Impact Statement, South Side Denali Moose Annual Report of Survey-Inventory Activities.

2008a "Brown Bears" Wildlife Notebook Series. Sterling Eide and Sterling Miller. Revised by L. Van Daele and reprinted 2008. Accessed via www.adfg.state.ak.us on May 7, 2010.

2008b "Dall Sheep" Wildlife Notebook Series. Sigurd T. Olson. Revised by K. Whitten and W. E. Heimer and reprinted 2008. Accessed via www.adfg.state.ak.us on May 7, 2010.

2008c "Caribou" Wildlife Notebook Series. P. Valkenburg. Revised by S. Arthur and reprinted 2008. Accessed via www.adfg.state.ak.us on May 7, 2010.

2008d "Wolf" Wildlife Notebook Series. Revised by B. Stephenson and R. Boertje 2008. Accessed via www.adfg.state.ak.us on May 7, 2010.

2008e "Moose" Wildlife Notebook Series. R. A. Rausch, B. Gasaway, and C. Schwartz. Revised by J. and S. Crouse and reprinted 2008. Accessed via www.adfg.state.ak.us on May 7, 2010.

2010 "Alaska's Species of Special Concern." Accessed via www.adfg.state.ak.us/special/esa/species_concern.php on July 6, 2010.

Alaska Department of Labor and Workforce Development (DLWD)

2009 *Alaska Economic Trends, September 2009 – The Denali Borough.* Available online at: http://labor.state.ak.us/trends/sep09.pdf.

2010 *Workforce Info – Quarterly Census of Employment and Wages – a data series*. Data for 2008 and 2009. Available online at: http://laborstats.alaska.gov/cgi/databrowsing/?PAGEID=4&SUBID=230.

Burson, S. L., III, J. L. Belant, K. A. Fortier, and W. C. Tomkiewicz, III

2000 "The Effects of Vehicle Traffic on Wildlife in Denali National Park." *Arctic* 53:146-151.

Chruszcz, B., A. P. Clevenger, K. E. Gunson, and M. L. Gibeau

2003 "Relationships Among Grizzly Bears, Highways, and Habitat in the Banff-Bow Valley, Alberta, Canada." *Canadian Journal of Zoology* 81:1378-1391.

Council on Environmental Quality (CEQ)

1981 "Forty Most Asked Questions Concerning Council on Environmental Quality's [CEQ] National Environmental Policy Act Regulations," 1981. Available online at: http://ceq.hss.doe.gov/nepa/regs/40/40p1.htm.

Dalle-Molle, J. and J. Van Horn

1991 "Observations of Vehicle Traffic Interfering with Migration of Dall Sheep, *Ovis dalli dalli*, in Denali National Park, Alaska." *Canadian Field-Naturalist* 105:409-411.

Denali Borough

2009 *Denali Borough Ordinance 09-8, An Ordinance for the Denali Borough Providing For the Establishment and Adoption of the Budget for the Fiscal Year 2010.* Available online at: http://www.denaliborough.govoffice.com/vertical/Sites/%7B63112C6F-13FC-4147-831D-8F3F0E33EC53%7D/uploads/%7B17F72600-953A-41EF-A35E-10D5CBADB1DD%7D.PDF.

2010 *Denali Borough Ordinance 10-07, An Ordinance for the Denali Borough Providing For the Establishment and Adoption of the Budget for the Fiscal Year 2011.* Available online at: http://www.denaliborough.govoffice.com/vertical/Sites/%7B63112C6F-13FC-4147-831D-8F3F0E33EC53%7D/uploads/%7BA901C1CB-F263-4642-B0C1-B0A4B2EA78B5%7D.PDF.

No Date Information regarding the Denali Borough Landfill. Available online at: http://www.denaliborough.govoffice.com/index.asp?Type=B_BASIC&SEC={1A3B8059-0650-4AAC-A8E2-D6E80C91D187}.

Geist, V.

1978 *Big Game of North America: Ecology and Management*. J. L. Schmidt and D. L. Gilbert, eds. Stackpole Books. Harrisburg, PA, USA.

HDR Alaska Inc.

2009 Denali Park Road Alternatives for Vehicle Management, Report to Denali National Park and Preserve. October.

Knight, R. L. and D. N. Cole

1991 *Effects of Recreational Activity on Wildlife in Wildlands*. Transactions of the North American Wildlife and Natural Resources Conference 56:238-247.

Mace, R., L. Phillips, T. Meier, and P. Owen

2012 Habitat use and movement patterns of grizzly bears in Denali National Park relative to the Denali Park Road. Natural Resource Technical Report.

Manning, R., J. Hallo, and W. Valliere

2010 Denali Park Road Visitor Survey 2010 - Final Report. Park Studies Laboratory, University of Vermont, Burlington, VT. Available online at: http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm.

Manning, R. and J. Hallo

2009 Indicators and standards of quality for the visitor experience on the Denali Park Road. Park Studies Laboratory, University of Vermont, Burlington, VT. Available online at: http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm.

Manning, R. E. and J. C. Hallo

2010 The Denali park road experience: Indicators and standards of quality. *Park Science* 27:33-41.

McIntyre, C.

2010 Personal communication with C. McIntyre, Wildlife Biologist, Denali National Park and Preserve. June and December 2010.

Mech, L. D., L. G. Adams, T. J. Meier, J. W. Burch, and B. W. Dale

1998 The Wolves of Dena*li*. University of Minnesota Press, Minneapolis, MN.

Meier, T. J.

2009 *Vital Signs Monitoring of Wolf (*Canis lupus*): Distribution and Abundance in Denali National Park*. Natural Resource Data Series NPS/CAKN/NRDS 2009/009. National Park Service, Fort Collins, CO.

2010 Personal communication with T. J. Meier, Wildlife Biologist, Denali National Park and Preserve. June and December 2010.

Meier, T. J., J. W. Burch, L. D. Mech, and L. G. Adams

1995 "Pack Structure and Genetic Relatedness among Wolf Packs in a Naturally Regulated Population." In: *Ecology and Conservation of Wolves in a Changing World*, L. N. Carbyn, S. H. Fritts, and D. R. Seip, eds. Canadian Circumpolar Institute, Edmonton, Alberta.

Morris, T., J. Hourdos, M. Donat, and L. Phillips

2010 "Modeling traffic patterns in Denali National Park and Preserve to evaluate effects on visitor experience and wildlife." *Park Science* 27:48-57.

Murie, A.

1944 *The Wolves of Mount McKinley*. U.S. National Park Service Fauna Series, No. 5. Washington, DC.

1981 *The Grizzlies of Mount McKinley*. U.S. National Park Service Scientific Monograph Series, No. 14. Washington, DC.

National Park Service (NPS)

1986 "Wilderness Suitability Review" (as part of 1986 *General Management Plan* for Denali National Park and Preserve). NPS, Denali National Park and Preserve, Alaska.

1989 Population Status and Calf Mortality of the Denali Caribou Herd, Denali National Park and Preserve, Alaska – 1984-1988. Alaska Region Natural Resources Progress Report, AR-89/13, by L. G. Adams, B. W. Dale, and B. Schults.

1997 *Entrance Area and Road Corridor Development Concept Plan*.

2000 *Denali National Park and Preserve Rules of the Road*.

2005 *Denali National Park and Preserve Revised Draft Backcountry Management Plan - General Management Plan Amendment and Environmental Impact Statement*. NPS, Denali National Park and Preserve, Denali Park, AK.

2006a *Management Policies 2006*.

2006b *Denali National Park and Preserve Final Backcountry Management Plan - General Management Plan Amendment and Environmental Impact Statement*. NPS, Denali National Park and Preserve, Denali Park, AK.

2006c *Denali National Park and Preserve Final South Denali Implementation Plan and Environmental Impact Statement*. NPS, Denali National Park and Preserve, Denali Park, AK. April 2006.

2007 *Denali National Park and Preserve Road Design Standards*. Denali National Park and Preserve, Denali Park, AK.

2008 *Denali National Park and Preserve Consolidated General Management Plan*.

2009a Alaska Region Invasive Management Plan Environmental Assessment. August 2009.

2009b *Denali National Park and Preserve Education Plan*.

2009c "Surveying Dall Sheep Populations" factsheet. NPS, Denali National Park and Preserve, Denali Park, AK.

2009d "Large Mammals… How Many Are There?" factsheet. NPS, Denali National Park and Preserve, Denali Park, AK.

2009e "Wolf Monitoring 1986-2009" factsheet. NPS, Denali National Park and Preserve, Denali Park, AK.

2009f "Moose Surveys" factsheet. NPS, Denali National Park and Preserve, Denali Park, AK.

2009g *Denali National Park and Preserve Resource Stewardship Strategy 2008-2017*. Denali National Park and Preserve, Denali Park, AK.

2010a *Summary of Current Resource Projects 2010*. Center for Resources, Science, and Learning. NPS, Denali National Park and Preserve, Denali Park, AK.

2010b "Visitor Statistics and Trends Notebook, 1996 to 2010" (Excel-based digital file). Prepared by Andrew Ackerman, Social Scientist. Denali National Park and Preserve.

2011 "Assessment of Vehicle Use and Wildlife Sightings in Denali National Park, Summary Report 2006-2009." Unpublished draft.

Owen, P. A. and T. J. Meier

2009 *2008 Aerial Moose Survey, Denali National Park and Preserve.* National Park Service, Denali Park, AK.

Phillips, L. M., B. Borg, and M. L. Snover

2012 "Assessment of Vehicle Use and Wildlife Sightings in Denali National Park: Summary Report 2006-2009." In press as an NPS Technical Memorandum and available at: http://www.nps.gov/dena/naturescience/denali-park-road-capacity-study.htm.

Phillips, L. M., R. Mace, and T. Meier

2010 "Assessing Impacts of Traffic on Large Mammals in Denali National Park and Preserve." *Park Science*, 27(Fall 2010):2, ISSN 1090-9966. National Park Service, Natural Resource Program Center, Office of Education and Outreach. Lakewood, CO.

Putera, J. A. and J. A. Keay

1998 *Effect of Vehicle Traffic on Dall Sheep Migration in Denali National Park, Alaska*. Final report, U.S. Geological Survey, Biological Resources Division.

Servheen, C., J. Waller, and W. Kasworm

1998 "Fragmentation Effects of High-Speed Highways on Grizzly Bear Populations Shared Between the United States and Canada." In *Proceedings of the International Conference on Wildlife Ecology and Transportation*. G. L. Evink et al., eds. Florida Department of Transportation, Tallahassee, FL.

Smith, E.

2002 BACI design. In: H. El-Shaarawi and W. W. Piegorsch, eds. Encyclopedia of Environmetrics. John Wiley & Sons, Ltd. Chichester.

Smith, T. S., S. Herrero, and T. D. DeBruyn

2005 "Alaskan Brown Bears, Humans, and Habituation." *Ursus* 16:1-10.

Stalmaster, M. V.

1983 "An Energetics Simulation Model for Managing Wintering Bald Eagles." *Journal of Wildlife Management* 47:349-359.

Stynes, D. and A. Ackerman

2010 *Impact of Visitor Spending on the Local Economy: Denali National Park and Preserve, 2008*.

Talerico, D., Mayor of Denali Borough

2010 Personal communication with Ron Dutton, Sammons/Dutton LLC. August 5, 2010.

Taylor, A. R. and R. L. Knight

2003 *Wildlife Responses to Recreation and Associated Visitor Perceptions*. *Ecological Applications*, 13(4):951-963. Ecological Society of America Stable. Available online at: http://www.jstor.org/stable/4134735. August 2003.

Troyer, W. A.

1977 *Population and Movement Studies of the McKinley Caribou Herd, 1976*. Progress report, National Park Service, Anchorage, AK.

Underwood, A. J.

1994 On beyond BACI: sampling designs that might reliably detect environmental disturbances. *Ecological Applications* 4:4-15.

U.S. Bureau of Economic Analysis

2010 *Regional Economic Information System – 1969 to 2008*. Personal Income and Earnings– NAICS (CA05N). Available online at: http://www.bea.gov/regional/.

U.S. Census Bureau

2009 Small Area Income and Poverty Estimates – Alaska and Denali Borough. Available online at: http://www.census.gov/cgi-bin/saipe/saipe.cgi.

2010a "State and County Quick Facts: Denali Borough." Available online at: http://quickfacts.census.gov/qfd/states/02/02068.html.

2010b Annual Estimates of the Resident Population for Counties of Alaska: April 1, 2000 to July 1, 2009 (CO-EST2009-01-02). Available online at: http://www.census.gov/popest/counties/CO-EST2009-01.html.

U.S. Fish and Wildlife Service (USFWS)

2007a Brown Bear Fact Sheet, 2007. USFWS.

2007b Gray Wolf Fact Sheet, 2007. USFWS.

2008 *Birds of Conservation Concern 2008*. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pp. Available online at: http://www.fws.gov/migratorybirds

University of Vermont (UVM)

2009 "Indicators and Standards of Quality for the Visitor Experience on the Denali Park Road." Park Studies Laboratory.

Weaver, J. L., P. Paquet, and L. F. Ruggiero

1996 "Resilience and Conservation of Large Carnivores in the Rocky Mountains." *Conservation Biology* 10:964-976.

Whittaker, D. and R. L. Knight

1998 "Understanding Wildlife Responses to Humans." *Wildlife Society Bulletin* 26:312-317.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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